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ABSTRACT

The City Planner's Manual is part of a set of 21 manuals (AA 001 009-001 029) used in APEX (Air Pollution Exercise), a computerized college and professional level "real world" game simulation of a community with urban and rural problems, industrial activities, and air pollution difficulties. The first two sections, which are the same in each of the student manuals (volumes 1 to 19), contain general information about the APEX interaction simulation and a glossary of reference terms. The remaining sections contain the following: planner's role description; annotated planner's worksheet; a sample planner's worksheet; background information for planner's role; an annotated printout for cycle one; and a map of the 29 APEX analysis areas. The manual is identical to the County Planner's Manual, except for the annotated printout for cycle one. The game simulation procedure and required computer facilities are further described in resumes for AA 001 009 and 001 010. (PR)

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Environmental
Protection
Agency

APEX

Air Pollution Exercise

Simulation
Exercises

VOLUME 18

CITY PLANNER'S MANUAL

APEX • VOLUME 18
CITY PLANNER'S MANUAL

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Section 1-1

Introduction to - APEX

APEX is one of, if not the most complex gaming-simulations of an urban area in use today. Although it was designed to supplement standard teaching methods, APEX is far more than an educational tool. It is a communication channel of a new kind -- capable of providing both the language and the forum for information transfer between persons and groups with different educational and cultural backgrounds as well as different prespectives on urban life.

APEX is composed of two essential components (1) a computerized system made up of a series of well-integrated simulation models (2) linked to a "gamed" environment encompassing a series of interactive roles. The computerized system predicts the changes that occur in several sectors of urban life in response to the decisions made by participants in the "gamed" environment, decisions made by persons outside the "gamed" environment (other actors whose behavior is simulated in the computer), and external pressures on the city (also simulated in the computer).

The county of APEX is run year by year by a set of elite decision makers performing both the mundane and extraordinary functions of their office in the "gamed" environment. Each cycle or year is condensed in time to a three to eight hour session during which the decision makers formulate their yearly policy. The decisions that emerge out of the "competitive-cooperative" environment of the gaming-simulation are used as priming inputs to the computer simulation. The change in the status of the urban area is calculated by the computer and returned to the decision makers as the primary input to the next cycle of action. Included in the change picture generated by the computer are selected social indicators measuring the magnitudes of change in assorted key areas and a newspaper serving as the focal point of local public opinion.

The key decision makers acting in the gamed environment include politicians and planners from a central city and a county, an air pollution control officer from the county, and land developers and industrialists from the private sector. The politicians are responsible for the administration of their respective jurisdictions and for the formulation and implementation of various programs to upgrade the social status of their constituents. The planners serve as aides to the politicians and represent the major long range coordinating force in the community. The air pollution control officer is charged with the task of cleaning and monitoring the air mass above APEX county. The land developers and industrialists have the responsibility of running their particular business concerns within the confines of the county. It is expected that each decision maker will find it to his advantage to coordinate and/or compete with other players in his efforts to promote his strategies. The APEX General Interaction Diagram included here (see page) indicates possible linkages among players and between players and the simulation.

In general, people have great difficulty understanding the dynamics of a complex system through traditional means. Gaming-simulation offers participants the opportunity to study, work with, and discuss the structure of such a system and to experiment with intervention strategies designed to change that structure. When used as a teaching device, the strength of a gaming-simulation such as APEX lies in the opportunity afforded participants for involvemnt in the system. When compared with the passive observation of the system offered by traditional methods, this approach has had great success.

In theory, complex gaming-simulation of the APEX variety is more than a training device or communications facilitator. If the models were more sophisticated the data base more accurate and more complete, a complex gaming-simulation would be a policy testing device for use by practicing urban politicians, planners, APCO's and administrators. Conditional predictions (predictions based on the particular policies and/or decisions submitted to the model) of the ramifications of various decisions can be generated through the use of a complex gaming-simulation -- predictions that may forewarn the model user of unforeseen reactions to policy at several levels of the urban hierarchy ranging from that of the highest level.

The gamed environment is similar to that found in a typical midwestern industrialized town. (In fact, the prototype city is Lansing, Michigan). It has a population approaching 220,000 including several of minority groups sharing racial or ethnic ties. There is a relatively dense central city in the heart of the county, an adjacent suburb and two outlying townships. Most of the industry is located in the central city (as are the minority groups). Major firms include a large auto plant and the state government offices. The suburb houses a major university. The townships are largely agricultural, although urbanizing settlements are dotting the landscapes. There is a major river running through the city serving as the primary drainage system for the county. The climate of APEX is temperate, with summer temperatures averaging about 70 degrees and winter temperatures averaging near 25 degrees. Prevailing winds are westerly, swinging to the southwest in summer and northwest in winter.

For the purposes of the gaming exercise, APEX county is divided into 29 analysis areas (see the attached map, Section 9). Population, employment and land use will be allocated to the areas and are categorized by types established especially for APEX. These types are described in the glossary included in this manual (Section 2) a glossary designed to aid participants in learning the terminology of urban and environmental management as well as that of the gaming exercise.

FOR ADDITIONAL INFORMATION:
Address inquiries to Chief, Institute for Air Pollution Training
Environmental Protection Agency
Research Triangle Park, North Carolina 27711

Section 1-1

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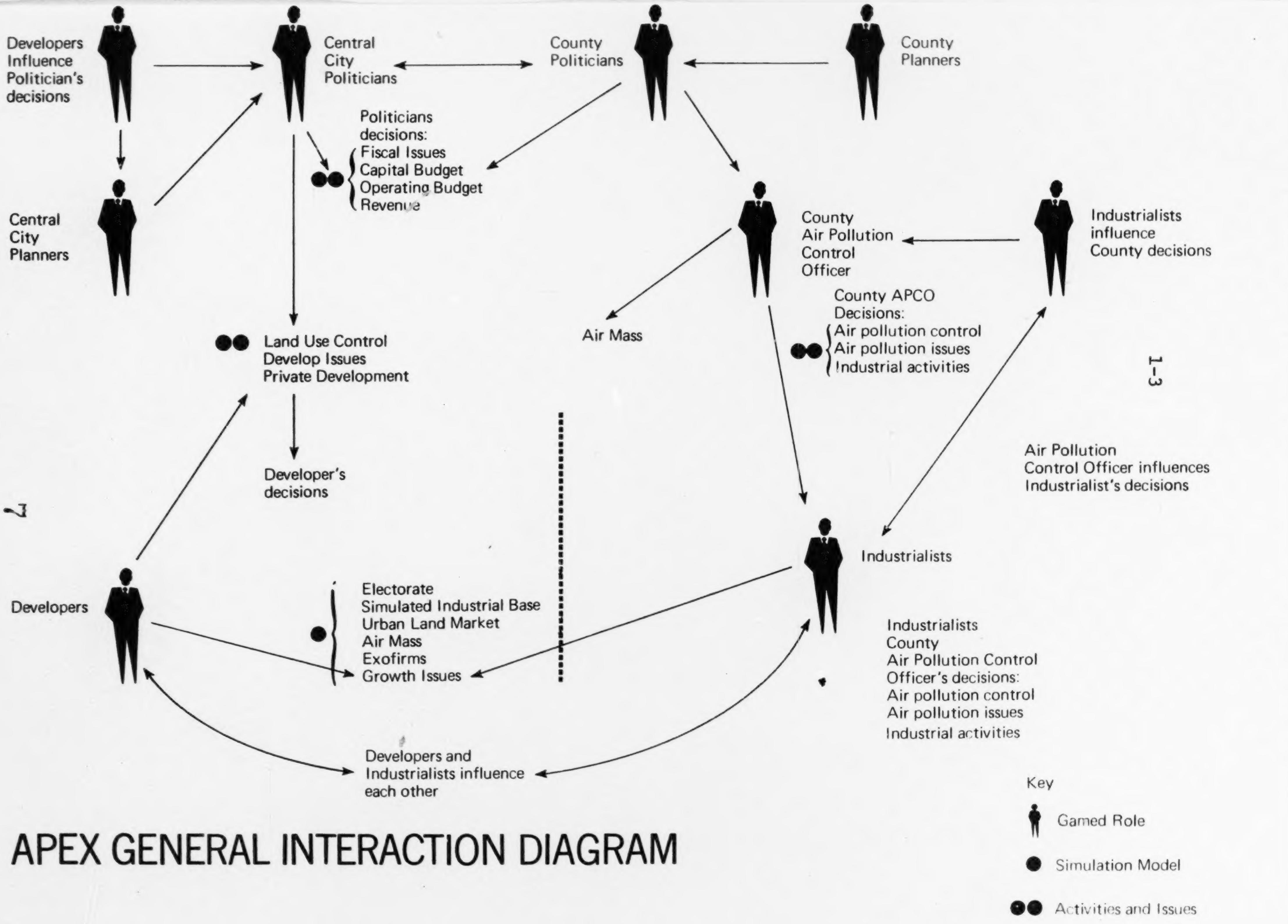
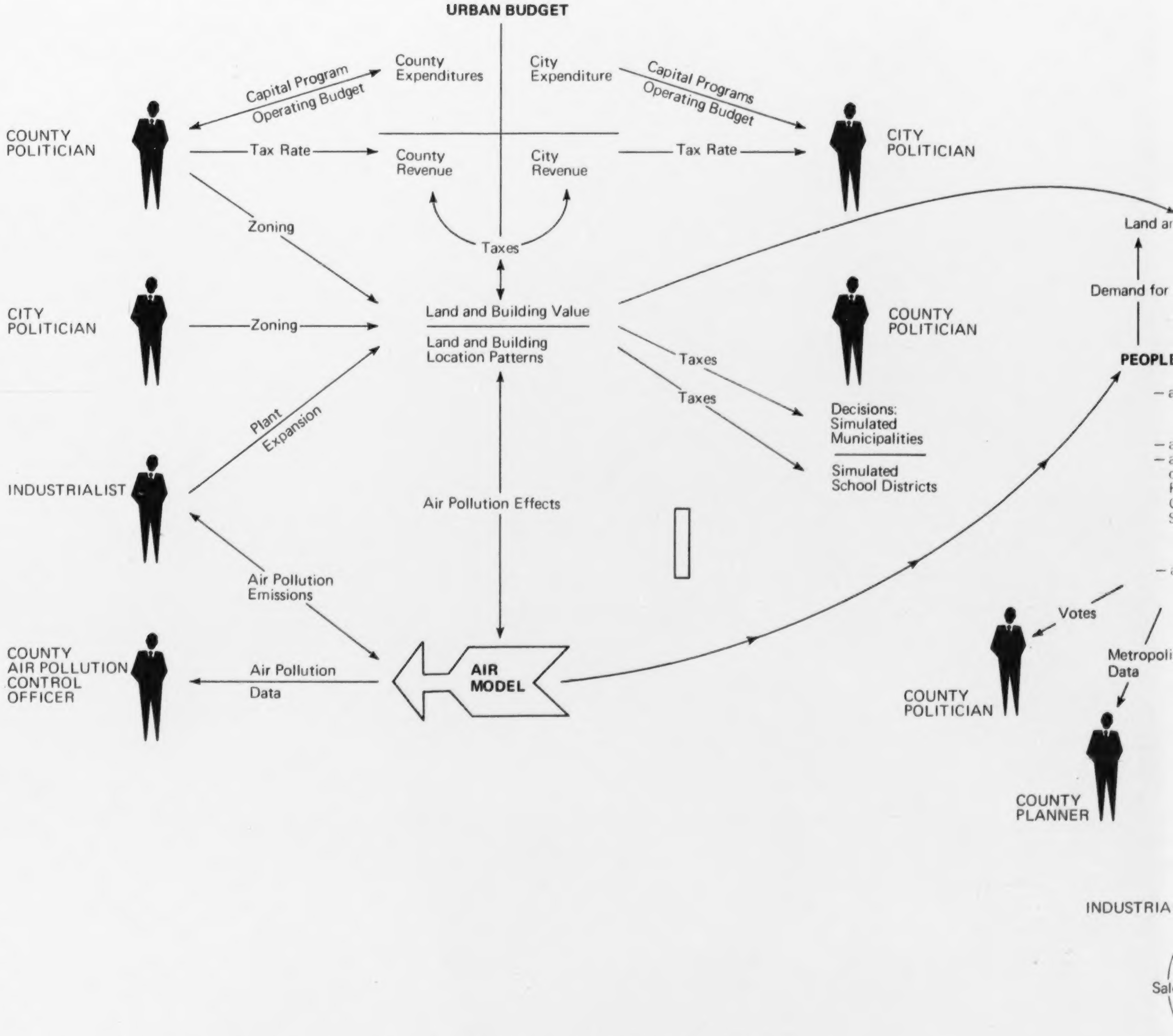


Developers Influence Politician's decisions
Central City Politicians
County Politicians
County Planners
Central City Planners
Politicians decisions:
Fiscal Issues
Capital Budget
Operating Budget
Revenue
County Air Pollution Control Officer
Industrialists influence County decisions
County APCO Decisions:
Air pollution control
Air pollution issues
Industrial activities
Land Use Control
Develop Issues
Private Development
Air Mass
Developer's decisions
Air Pollution Control Officer influences Industrialist's decisions
Industrialists
Developers
Electorate
Simulated Industrial Base
Urban Land Market
Air Mass
Exofirms
Growth Issues
Industrialists
County
Air Pollution Control
Officer's decisions:
Air pollution control
Air pollution issues
Industrial activities
Developers and Industrialists influence each other
Key
Gamed Role
Simulation Model
Activities and Issues

APEX GENERAL INTERACTION DIAGRAM


URBAN BUDGET
County Expenditures
City Expenditure
Capital Program
Operating Budget
Capital Programs
Operating Budget
COUNTY POLITICIAN
Tax Rate
County Revenue
City Revenue
Tax Rate
CITY POLITICIAN
Zoning
Taxes
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CITY POLITICIAN
Zoning
Land and Building Value
Land and Building Location Patterns
COUNTY POLITICIAN
Taxes
Taxes
PEOPL
Plant Expansion
Decisions: Simulated Municipalities
Simulated School Districts
INDUSTRIALIST
Air Pollution Effects
Air Pollution Emissions
Votes
COUNTY AIR POLLUTION CONTROL OFFICER
Air Pollution
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COUNTY PLANNER
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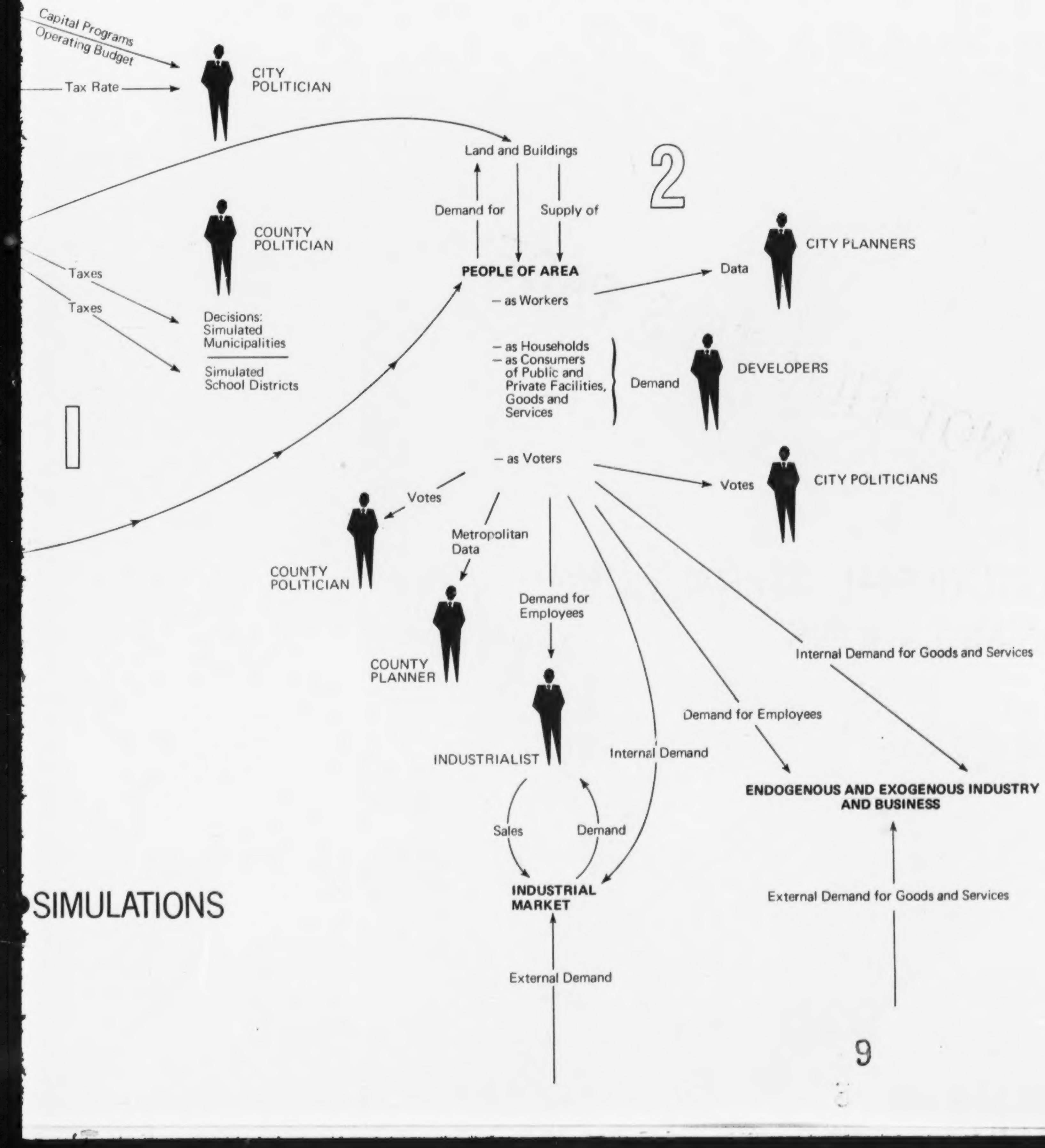
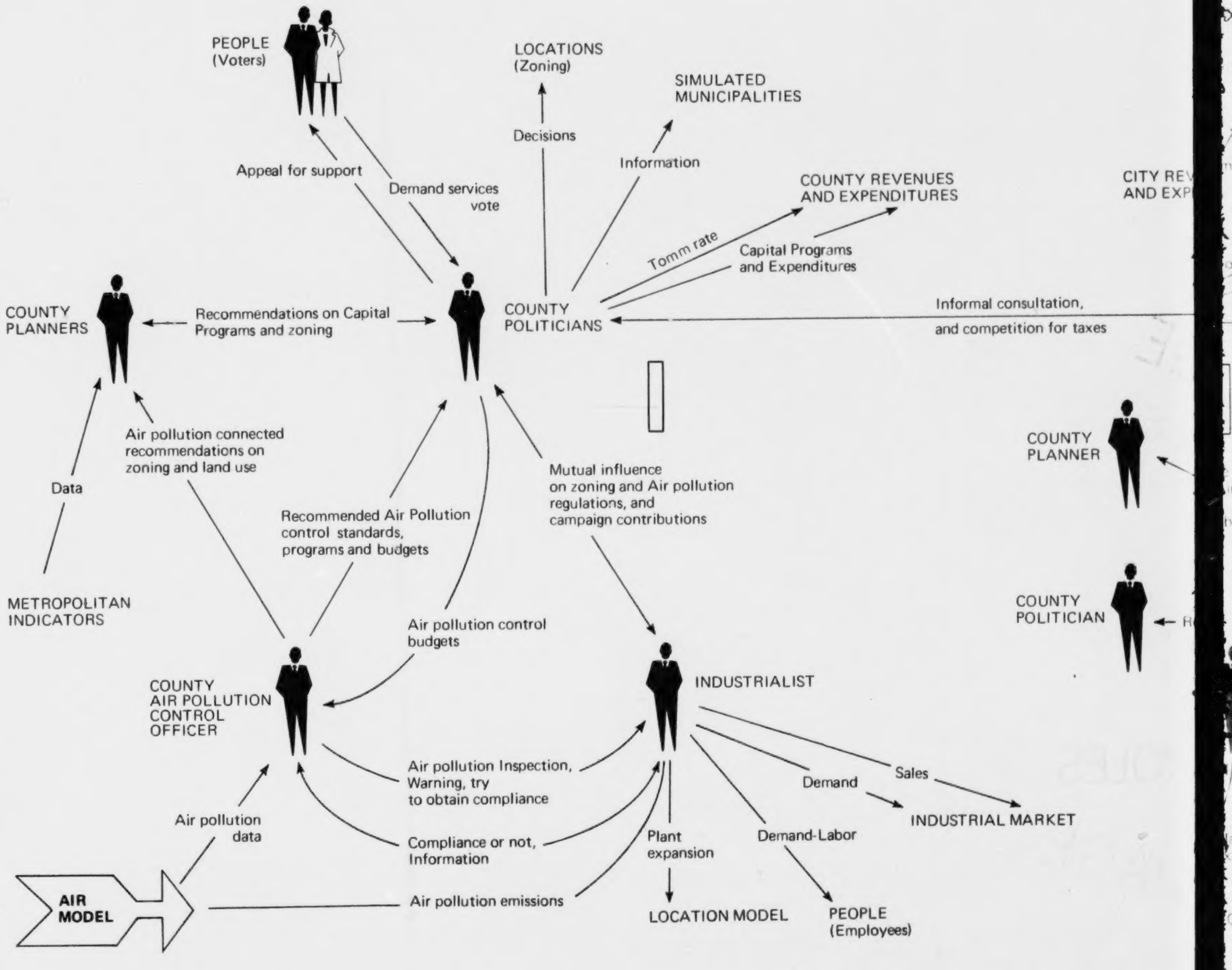
APEX FUNCTIONAL INTERACTIONS ● SIMULATIONS


Capital Programs
Operating Budget
Tax Rate
CITY POLITICIAN
Land and Buildings
2
Demand for
Supply of
COUNTY POLITICIAN
Taxes
Taxes
Decisions: Simulated Municipalities
Simulated School Districts
1
PEOPLE OF AREA
– as Workers
Data
CITY PLANNERS
– as Households
– as Consumers of Public and Private Facilities, Goods and Services
Demand
DEVELOPERS
– as Voters
Votes
CITY POLITICIANS
Votes
COUNTY POLITICIAN
Metropolitan Data
COUNTY PLANNER
Demand for Employees
INDUSTRIALIST
Internal Demand
Demand for Employees
Internal Demand for Goods and Services
ENDOGENOUS AND EXOGENOUS INDUSTRY AND BUSINESS
Sales
Demand
INDUSTRIAL MARKET
External Demand for Goods and Services
External Demand

SIMULATIONS


PEOPLE
(Voters)
LOCATIONS
(Zoning)
SIMULATED
MUNICIPALITIES
Decisions
Information
Appeal for support
Demand services
vote
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AND EXPENDITURES
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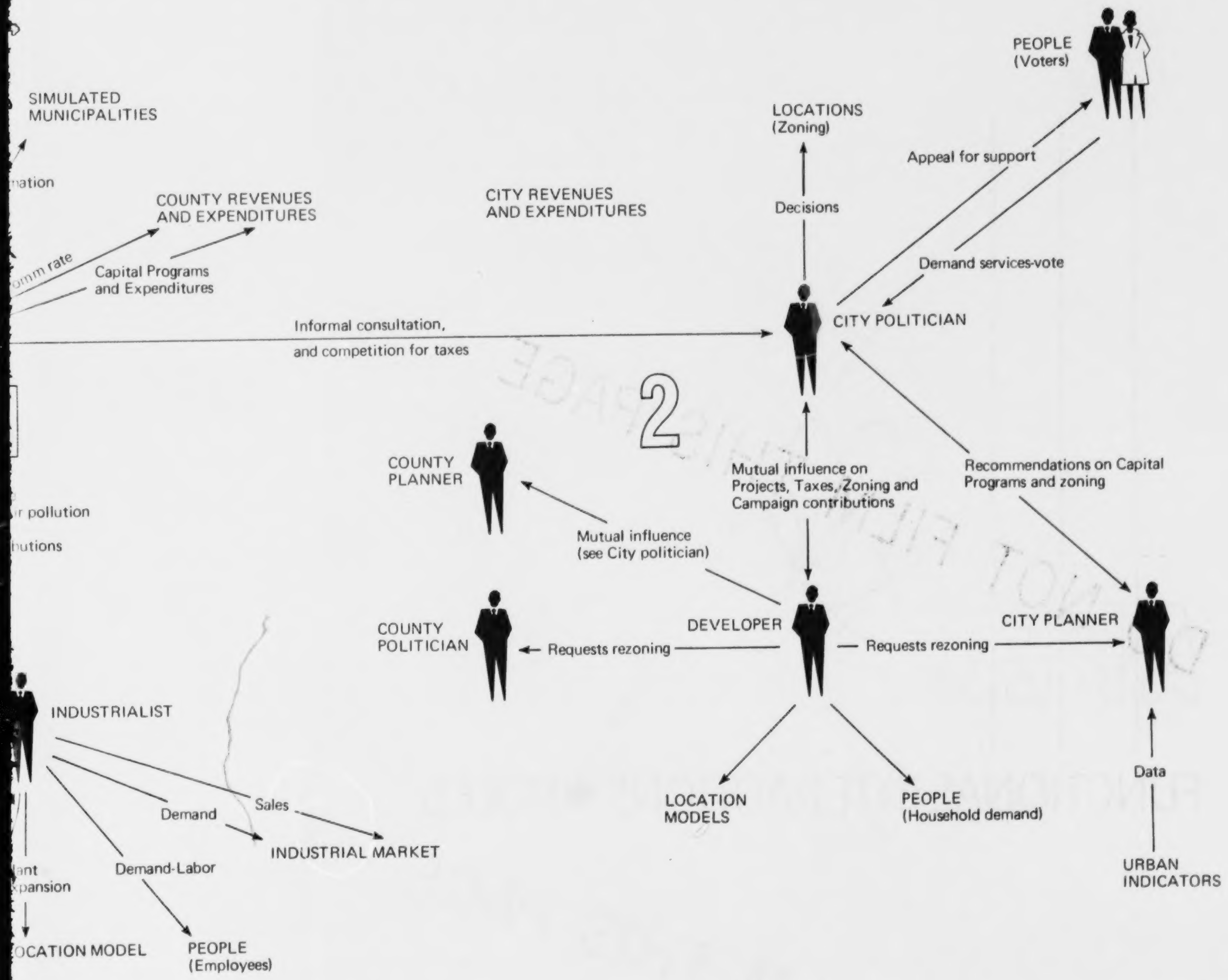
Tomm rate
Capital Programs
and Expenditures
COUNTY
PLANNERS
Recommendations on Capital
Programs and zoning
COUNTY
POLITICIANS
Informal consultation,
and competition for taxes
Air pollution connected
recommendations on
zoning and land use
Data
Mutual influence
on zoning and Air pollution
regulations, and
campaign contributions
COUNTY
PLANNER
Recommended Air Pollution
control standards,
programs and budgets
METROPOLITAN
INDICATORS
COUNTY
POLITICIAN
Air pollution control
budgets
COUNTY
AIR POLLUTION
CONTROL
OFFICER
INDUSTRIALIST
Air pollution Inspection,
Warning, try
to obtain compliance
Sales
Demand
INDUSTRIAL MARKET
Air pollution
data
Compliance or not,
Information
Plant
expansion
Demand-Labor
AIR
MODEL
Air pollution emissions
LOCATION MODEL
PEOPLE
(Employees)

APEX FUNCTI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CITY REVENUES AND EXPENDITURES
LOCATIONS (Zoning)
Decisions
PEOPLE (Voters)
Appeal for support
Demand services-vote
CITY POLITICIAN
Informal consultation,
and competition for taxes
2
COUNTY PLANNER
Mutual influence on Projects, Taxes, Zoning and Campaign contributions
Recommendations on Capital Programs and zoning
r pollution
butions
Mutual influence (see City politician)
COUNTY POLITICIAN
Requests rezoning
DEVELOPER
Requests rezoning
CITY PLANNER
INDUSTRIALIST
Sales
Demand
INDUSTRIAL MARKET
Demand-Labor
LOCATION MODELS
PEOPLE (Household demand)
Data
URBAN INDICATORS
ant
pansion
OCATION MODEL
PEOPLE (Employees)

APEX FUNCTIONAL INTERACTIONS●ROLES

Section 2-1

GLOSSARY AND REFERENCE TERMS

ABATEMENT

Abatement is the reduction of pollutant emissions from a source or sources.

AIR POLLUTION

Air pollution is the presence in the outdoor air of substances which, when present in sufficient quantity or over a period of time, can cause an undesirable effect upon man, property, or the environment.

AIR POLLUTION REGULATIONS

Air pollution regulations are legal constraints on pollutant emissions, production processes, or control systems. State regulations and County regulations are enforceable by legal sanctions, while recommendations are not.

AIR QUALITY

Air quality refers to the pollution concentration characteristics of the atmosphere or ambient air in a given area. It is usually stated in terms of the levels of concentration of specific pollutants, in parts of pollutant per million parts of air. (See CONCENTRATION.)

Air Quality Goals are expressions of desirable maximum pollutant concentrations to be achieved through a pollution control program.

Air Quality Standards are quantitatively-specified maximum levels of pollutant concentrations or dosages, as more precise statements of air quality goals.

ALERT STAGES

Alert Stages refer to critical levels of concentration or dosage signalling potential disastrous pollution effects and requiring emergency abatement and control measures.

ANALYSIS AREA (A.A.)

Analysis areas are used as the primary areal reference units for the data and issues throughout the game. The County is divided into a number of analysis areas, each of which is the approximate size of several census tracts. The analysis areas included in the five jurisdictions are as follows:

Jurisdiction 1 -- Central City: Ward 1 = AA 1 through AA 4
Ward 2 = AA 5 through AA 8
Ward 3 = AA 9 through AA 13

Jurisdiction 2 -- Suburb: AA 17 through AA 19

Jurisdiction 3 -- Township 1: AA 23 through AA 28

Jurisdiction 4 -- Township 2: AA's 14-16, 20-22, 29

Jurisdiction 5 -- County: AA's 1-29

(See APEX Analysis Area map)

ANNUAL WAGE

This is the annual cost to the Industrialist of one worker and is an average of the various rates of pay applicable to the different types of workers in the firm. The applicable average wage rate for each firm is reported in the Industrialist's output each cycle under cost factors.

ASSESSED VALUE

Assessed value is the value assigned to real estate property for purposes of assessing taxes owed to each of the Jurisdictions, County and school districts. Governments are required by law to maintain an assessed value of 50% of market value for property in their jurisdiction, although this requirement is often not met. (E.g. if a residential property is valued on the market at $20,000, its assessed value is $10,000.) (See STATE EQUALIZED VALUE.)

BOARD OF DIRECTORS

Each Industrialist acts as a Plant Manager and is responsible to the Board of Directors of his plant for his decisions and actions. The Board has the ultimate decision-making power in Plant affairs and may approve, amend or reject the Manager's fiscal policy proposal. The Board also sets the amount of dividends to be paid to the stockholders.

BONDING

Bonding is the process of incurring public debt to finance some capital improvement project. It is a device used to extend the incidence of costs over a long period of time, rather than have costs met out of current revenues while the project is under construction. Politicians may issue two kinds of bonds, general obligation bonds and revenue bonds. These differ in three respects: (1) the need for voter concurrence, (2) how they are paid off, and (3) the kinds of projects for which they are appropriate. Before Politicians may float general obligation bonds to finance projects, voters must approve this action in a referendum. There is a State-imposed limit on the indebtedness that a jurisdiction may incur through general obligation bonds. The amount of additional

bonded indebtedness that can be sought is indicated in the Politician's output as "$ Limit on Next Bond Sought".
(See DEBT RETIREMENT for the process of financing general obligation bonds.)
Revenue bonds are not submitted to a referendum and are appropriate only for particular projects. (Projects for which they may be used are noted in the Project List.) They are paid off through fees collected for the service provided by the facility, rather than by taxes.

CAPITAL PLANT INDEX (C.P.I.)

The capital plant index is a ratio of the present dollar value of public capital facilities (sewers, water lines, streets, parks and miscellaneous public holdings) to population equivalents. This number reflects the load imposed on facilities by residents, employees and clients, and thus is considered as an indication of the relative level of adequacy of these facilities. Present dollar value is calculated each cycle on the basis of depreciated value of existing facilities plus new facilities. (Facilities depreciate at about 5% of original value per year.)
(See POPULATION EQUIVALENT.)

CASH CARRYOVER

This is the cash reserve which an Industrialist or Developer carries over to the next cycle after making all his expenditures, including those for capital plant. It represents as-yet uncommited funds, which the player is free to use in the next cycle.

CASH TRANSFER

A cash transfer is used for loans or gifts of cash between players when the reason for the exchange is unspecified. Revenues made, or expenditures incurred, through an exchange of cash between either the Government, Industrialist, or Developer, are recorded in the budget section of the output. When applicable, cash transfers are also used to cover the cost of television time and newspaper articles.

COMBUSTION

Combustion is the process of burning fuel or wastes.

CONCENTRATION

Concentration is the ratio of pollutants to effluent gases or ambient air, measured in parts per million (ppm) as a volume to volume ratio, or micrograms per cubic meter (UG/cubic meter) as a weight to volume ratio. Data on mean concentration per quarter, concentration on worst day, and number of days above a specified concentration can be obtained by the APCO, through the installation and operation of monitoring stations.

CONTAMINANT See POLLUTANT

CONTROL EFFICIENCY

Control efficiency refers to the ratio of the amount of a pollutant removed from effluent gases by a control device to the total amount of pollutant without control.

CONTROL SYSTEM

Control system refers to equipment and/or procedures intended to reduce the amount of a pollutant, or pollutants, in effluent gases. Each gamed industrial firm has a limited set of control system options for each production or combustion process.

DEBT RETIREMENT (Debt Service)

Debt retirement, or debt service, is a term used to describe the process of paying off long-term general obligation bonds sold by public agencies. Debt retirement is a budget category of the Politician which includes expenditures for both principal and interest on general obligation bonds. Financing of these expenditures may be with either normal millage or debt retirement millage.

DEMOLITION COSTS (Clearance Costs)

A demolition cost of 5% of the assessed value of developed property must be paid when developed land is rezoned.

DENSITY

In residential areas, density is the term used to express the number of dwelling units per acre of land. In APEX a different density is associated with each of the five residential development types, with the lowest density found in land use category R-1 and the highest in category M-2.
The table on the following page expresses housing density in housing units per acre, and in acres per housing unit.

DEPRECIATION ALLOWANCE

Each cycle, the total value of capital facilities, (building and equipment) depreciate. A tax credit of 5% of the capital value facilities is allowed the industrialist to compensate for this depreciation. The amount is deducted before Federal and State income taxes are paid. The industrialist may claim any part of his maximum allowance; any portion of the allowance not taken will accumulate. The maximum depreciation allowance is listed under cost factors in the industrialist's output.

2-5

HOUSING DENSITY

AA	R-1		R-2		R-3		M-1		M-2	
	Units per Acre	Acres per Unit	Units per Acre	Acres per Unit	Units per Acre	Acres per Unit	Units per Acre	Acres per Unit	Units per Acre	Acres per Unit
1	1.4	.71	3.5	.29	5.6	.178	11.2	.089	21.0	.047
2	2.4	.41	6.0	.16	9.6	.104	19.2	.052	36.0	.027
3	2.0	.5	5.0	.20	8.0	.125	16.0	.062	30.0	.033
4	2.8	.35	7.0	.14	11.2	.089	22.4	.046	42.0	.023
5	2.1	.47	5.3	.18	8.4	.119	16.8	.059	31.5	.031
6	1.6	.62	4.0	.25	6.4	.156	12.8	.078	24.0	.041
7	2.5	.4	6.3	.15	10.0	.10	20.0	.050	37.5	.026
8	3.0	.33	7.5	.13	12.0	.083	24.0	.041	45.0	.022
9	1.2	.83	3.0	.33	4.8	.208	9.6	.104	18.0	.055
10	2.5	.4	6.3	.158	10.0	.10	20.0	.050	37.5	.026
11	1.0	1.	2.5	.4	4.0	.25	8.0	.125	15.0	.066
12	1.0	1.	2.5	.4	4.0	.25	8.0	.125	15.0	.066
13	1.0	1.	2.5	.4	4.0	.25	8.0	.125	15.0	.066
14	.5	2.	1.3	.76	2.0	.5	4.0	.25	7.5	.013
15	.6	1.66	1.5	.66	2.4	.41	4.3	.208	9.0	.011
16	.8	1.25	2.0	.5	3.2	.31	6.4	.156	12.0	.083
17	1.2	.83	3.0	.33	4.8	.208	9.6	.104	18.0	.055
18	2.3	.43	5.8	.172	9.2	.108	18.4	.054	34.5	.028
19	3.0	.33	7.5	.13	12.0	.083	24.0	.041	45.0	.022
20	.8	1.25	2.0	.5	3.2	.31	6.4	.156	12.0	.083
21	.5	2.	1.3	.76	2.0	.5	4.0	.25	7.5	.013
22	.4	2.5	1.0	1.	1.6	.62	3.2	.31	6.0	.16
23	.7	1.42	1.8	.55	2.8	.35	5.6	.178	10.5	.095
24	.3	3.33	.8	1.25	1.2	.83	2.4	.41	4.5	.022
25	.4	2.5	1.0	1.0	1.6	.62	3.2	.31	6.0	.16
26	.3	3.33	.8	1.25	1.2	.83	2.4	.41	4.5	.022
27	.6	1.66	1.5	.66	2.4	.41	4.8	.208	9.0	.011
28	.3	3.33	.8	1.25	1.2	.83	2.4	.41	4.5	.022
29	.5	2.	1.3	.76	2.0	.5	4.0	.25	7.5	.013

DEVELOPMENT TYPES AND COSTS

A. Residential

In APEX there are various levels of cost and density associated with different qualities and sizes of housing which may be built by Developers. These costs are for structures, exclusive of land and site improvements.

Single Family
Three different development-cost levels are applicable to APEX single-family housing units, ranging from the highest construction cost of $40,000 (designated as R-1) to the lowest cost housing, built at $15,000 per unit (designated as R-3). Any one of these types may be built on land which, when vacant, is zoned R.

Multiple Family
Units of two different cost levels, M-1 and M-2, are available for construction of multi-family housing in APEX. The highest cost per unit, for M-1, is $30,000 and the lowest, for M-2, is $12,000. Either of these types may be constructed on vacant land zoned M.

Residential Development Costs per Unit

R-1	R-2	R-3	M-1	M-2
$40,000	$22,500	$15,000	$30,000	$12,000

B. Commercial

Two types of commercial land use are allowable in APEX. These relate to local neighborhood shopping facilities and to regionally-oriented commercial and service facilities. Both may be built only on zoning category C land. Each is developed on a cost-per-acre basis, as follows:

Commercial Development Costs by Type

CL	CR
$100,000	$125,000

C. Industrial

Endogenous industrial development permitted Developers in APEX is on a per-acre basis, the cost being $100,000 per acre. Zoning category I land may be developed into this land use.

(See ZONING CATEGORY.)

DOSAGE

The specified time duration of an air pollutant's critical concentration level in a particular location, or for a particular person, material, etc., is known as dosage.

EFFLUENT

Effluents are the total gaseous emissions from production and combustion processes and activities, including air pollutants and non-noxious material.

ELITE OPINION POLL (E.O.P.)

The Elite Opinion Poll calls for a vote of all game players on certain major policy issues in the community. These issues appear as headlines in the M.E.T.R.O.-APEX News, which ask for either a deciding or advisory vote. The results of the Poll affect public officials' chances of re-election, as well as the probabilities of passage of general referenda and specific bond issue and special millage requests.

EMISSIONS

Emissions are pollutants in effluent or exhaust gases which are released into the air.

EMISSION FACTORS

Emission factors are estimates which can be used to approximate the rate of emissions of specific pollutants from generalized sources.

EMISSION MEASUREMENT

Air pollution emissions are measured in pounds per hour for particulates, sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NO_x), and hydrocarbons (HC); in Ringelmann number for smoke; and in Stinkelmann number for odor. The emissions measured are of specific pollutants from specific sources.

EMISSION RATE

Emission rate refers to the amount of pollutant emitted per unit of time. Maximum allowable emissions will be specified in pounds per hour if they refer to emission rates.

EMISSIONS SOURCE

An emission source is the origin of some specific air pollutants. In the game there are several gamed point sources, about thirty non-gamed point sources, plus motor vehicles and space heating as line and area sources, respectively.

EXOFIRM (EXOGENOUS FIRM)

An Exofirm is an industry or bureaucratic firm that depends primarily upon markets outside the local area for its growth and vitality. These firms are usually classified as Exofirms on the basis of their being net importers of dollars and net exporters of products or services to these outside markets. Jobs created by Exofirm growth spur additional growth of households and jobs oriented to the local market. (Exofirms are also often referred to as basic firms). In APEX, Exofirms locate in zoning categories I and O. Periodically, the newspaper will note the opportunity for Developers to invest, in a speculative way, in the entry of new Exofirms into the metropolitan area, with a variable probability of success attached to such investments. Occasionally, these Exofirms require rezoning of land and/or installation of special capital improvements. Requirements for such special public action and requests for private investment will be noted in the newspaper announcement of the firm's interest in locating in the area.

FUEL RATE

The amount of fuel consumed by each industry per unit of time is specified in tons/hours for coal, in barrels (bbl)/hour for oil, in thousand cubic feet (MCF)/hour for natural gas, and in megawatts (MW) for electricity.

FUEL TYPE

The fuel type possibilities include: low-grade coal (Lo-Coal), high-grade coal (Hi-Coal), low-grade oil (Lo-Oil), high-grade oil (Hi-Oil), natural gas, and electricity. The fuel option for each plant is listed in the Industrialist's output. The fuel grade refers inversely to the air pollution potential of the burning fuel, i.e., Lo-Grade has high pollution potential, and Hi-Grade fuels have low pollution potential.

HOUSEHOLD TYPES

The five household types used in APEX are characterizations of families belonging to fairly homogeneous socio-economic groups. These characterizations reflect life style, political involvement and voting habits, general consumption behavior and preference for public goods. There is substantial overlap of income levels for all status groupings; hence income, alone, is a weak indicator for characterizing households.

Household Type 1 -- is upper class and upper-middle class combined. Occupations of the heads of households are: professionals, technical workers, managers, officials, and proprietors. One-half of the family income levels are in excess of $15,000 and the other half are in the $10,000-$15,000 range. Value of housing is in excess of $20,000, and if they rent, rentals are over $150 per month. This is the group which is most concentrated in residential location. Education of the head of the household is at least college graduate, often with post-graduate study. Pressure group membership for this household type is found in the Chamber of Commerce and Good Government League.

Household Type II -- is the typical middle-class household in which the head's occupation is clerical, sales, or kindred types. Income of the family is primarily in the $7,000-$10,000 range. Education of the head of the household is some college or at least high school graduation. Housing value is primarily in the $15,000-$25,000 range, and gross rentals would usually be from $100 to $149 per month, though they may be somewhat lower. Pressure group affiliations for this type are with the Good Government League on the one hand, and with the ultra-conservatives on the other.

Household Type III -- the most numerous and widely-distributed of the five types is characterized by a mixed membership of very low income white collar workers, skilled craftsmen, and foremen, though the latter two predominate. In the outlying areas, farmers fall into this category. Family income is primarily in the $5,000-$9,000 range. The head of household's education is typically high school graduation. Housing value is usually in the $12,000-$20,000 range and rentals are from $80-$125 per month. Members of this group are apt to belong to the unions and/or the ultra-conservative pressure group.

Household Type IV -- is composed of semi-skilled workers, industry operatives and non-household service workers, such as waiters, barbers and parking-lot attendants. Family income is in the lower portion of the $4,000-$7,000 range. Housing values range from $10,000 to $14,000 with gross rentals being $70 to $90 per month. Education of the head of the household is usually 9 to 11 years. Pressure group membership for this household type is found in the unions and among the civil rights groups.

Household Type V -- is the lowest stratum of society, and heads of households are laborers or household service workers. The vast majority of the area's unemployed are of this type and roughly half of all members are elderly and retired. Family income is less than $5,000 annually and the value of housing is less than $10,000, with rentals primarily $50-$75 per month. Heads of households have usually not been educated beyond the eighth grade. Membership in pressure groups is found in the unions and civil rights groups.

Political involvement of the five household types declines from type I (the highest) to type V, the latter being generally apathetic. Likewise, concern with government operation and provision of public services is highest in type I households and declines steadily through type V families.
The five household types will tend to demand housing of the five residential development types according to the following percentages:

Household type I -- 50% will choose R-1; 30%, R-2, and 20%, M-1.
Household type II -- 20% will choose housing in each of the five development types.
Household type III -- 10% prefer R-1; 30% prefer R-2; 20% choose R-3; 25% take M-1, and 15%, M-2.
Household type IV -- 20% will choose R-2; 40%, R-3; 10%, M-1, and 30%, M-2.
Household type V -- 40% will be in R-3; 60% in M-2.

IMPROVEMENT COSTS

Improvement costs are fees to prepare raw land for development, including subdivision costs, sewer and water connections, drainage and engineering. Developers are required to pay improvement costs on all land on which they build structures. For residential property, improvement costs are on a per unit basis as follows:

R-1	R-2	R-3	M-1	M-2
$1,000	$800	$700	$600	$400

For commercial and local industrial land uses, improvement costs are on a per acre basis; for each the fee is $5,000 per acre.

These fees are automatically applied to all land on which the Developer builds.

INTEREST RATE

The cost of borrowing money will vary for the Industrialists and Developers according to both their credit rating and the length of the loan, i.e., how many years will be taken to repay it. Applicable interest rates are as follows:

	Credit Rating		
Years to Repay	A-1	A-2	A-3
1-2	4%	6%	8%
3-5	6%	8%	12%
6-10	8%	12%	16%
11-20	12%	16%	20%

The cost of borrowing money for governmental agencies -- the interest rate on bonds -- will vary according to the credit rating of the jurisdiction, and will differ between general obligation and revenue bonds. Since revenue bonds are not backed by governmental taxing power they are riskier and therefore carry higher interest rates than general obligation bonds. As a jurisdiction's credit rating falls from A-1 to A-3, the interest rate on general obligation bonds will increase from 4.5% to 6%.

ISSUE

Issue is used to refer to a problem situation presented to players in the APEX News. Following each issue are two to four alternatives from which one must be selected. (See ELITE OPINION POLL.)

JURISDICTION

Jurisdiction refers to one of the political units in APEX. Abbreviations used in the game are:

CC - Central City (Jurisdiction 1)
S - Suburb (Jurisdiction 2)
UT 1 - Township 1 (Jurisdiction 3 or Western Township)
UT 2 - Township 2 (Jurisdiction 4 or Eastern Township)
Co - County (Jurisdiction 5)

(See ANALYSIS AREA.)

LAND USE

Land use refers to the types of structures built upon particular pieces of land.

(See DEVELOPMENT TYPE and ZONING CATEGORY.)

MAXIMUM PRODUCTION CAPACITY

This is the maximum number of units which can be produced by a gamed industry in a cycle, given the plant and equipment in existence during that cycle. Maximum capacity may be increased by making capital expenditures for building and equipment. New productive capacity becomes available only in the cycle following that in which money is budgeted for plant expansion.

MILLAGE

Millage is the tax rate, in mills, which is applied to State equalized property value to generate property tax revenue. One mill is equal to a $1 charge on each $1000 of value, or one tenth of one percent of the State equalized value. There are three types of millage:

A. Normal Operating Millage is determined by local Politicians and is applied to standard operating costs of government by State and local law -- the local limit can never be higher than the limit set by the State.

B. Special Millage, which is not subject to State and local limits, can be used for financing special programs. It must be voted on in a referendum.

C. Debt Retirement Millage is not subject to the state and local limits but it can be used for retiring capital project bonds. This millage requires a favorable vote in a referendum.

Total millage is the sum of operating millage, any special millages and the debt retirement millages which may be in effect during the year.

MONITORING STATION

A monitoring station is a piece of equipment placed at a given location for measurement of air quality. An air quality monitoring station of one of five types may be installed and operated in any analysis area. The pollutants measured by each type of monitoring station are:

Type 1:	Particulates
Type 2:	Particulates and SO_2
Type 3:	Particulates, SO_2, and CO
Type 4:	Particulates, SO_2, CO, and NO_x
Type 5:	Particulates, SO_2, CO, NO_x, and Hydrocarbons

PARTICULATES

Particulates are solid particle air pollutants, which may be suspended in the air or may settle out, depending on the size of the particles, wind speed, and other factors.

PLANT INSPECTION

A plant inspection is an "on-site" examination of production and pollution control equipment, processes and procedures. Plant Inspections ordered by the APCO will provide him with information on the production processes; production capacity; fuel and process rates; control systems; smoke code (Ringelmann number); and odor code (Stinkelmann number) for each process of a specific gamed or non-gamed emission source.

PLANT MANAGER

The player in the role of Industrialist is acting as a Plant Manager. (See BOARD OF DIRECTORS.)

POPULATION EQUIVALENT

The population equivalent is a means of converting (a) residents, and (b) employees and clients of industries and commercial facilties into a standard measure of the demand placed on such public capital facilities as sewers, streets, and water supply. The population equivalent of an area (analysis area or jurisdiction) is computed as follows:

P.E. =[Total households]+[.8 × all employees of commerce and industry]

For use of population equivalents in APEX, see CAPITAL PLANT INDEX.

PRESSURE GROUP

There are five pressure groups represented in APEX which take stands on public policy issues and can influence voter behavior. The more extreme the position assumed by the pressure groups, either pro or con, (as indicated by a scale of +4 to -4), the greater will be the voter turnout for referenda and elections. Each pressure group derives its constituency from members of two or more household types. (See HOUSEHOLD TYPES)

1. Civil Rights Groups -- find their leadership in the elite liberal and in ghetto activists. The majority of their followers come from lower social strata. These groups represent both Negroes and Mexican-Americans. The orientation of the groups is primarily toward what they consider bread-and-butter issues, such as fair employment, and toward actions which focus on the neighborhoods in which they live. Thus, the Civil Rights groups tend to be active in specific cases, but their influence is moderate.

2. Good Government League -- is overwhelmingly middle-class, composed primarily of professional people, a heavy percentage of them women. This group is interested in a wide range of issues, in which they exert moderate influence, and is oriented toward governmental efficiency and toward community growth and image.

3. Chamber of Commerce -- draws many members from the business community and some from professional groups such as law, engineering, and medicine. This group exerts the highest degree of power of all pressure groups and is oriented primarily toward community image and "boosterism". However, when an issue tends to split the business community, this group is likely to take no position.

4. Unions -- are more conservative locally than nationally and exhibit some divergency between craft unions and industrial unions, the former being more conservative. The unions exert moderate influence on a range of issues somewhat less broad than those of interest to the Good Government League. The conservatism of the unions is especially apparent in the opposition of some of its constituency to public spending for social welfare.

5. Ultra-Conservatives -- draw membership from people who are isolated from most community affairs. Although members have average incomes, the education level of most is lower than the community average. These groups become involved in public issues only sporadically, taking extreme and noisy positions when they feel personally affected by proposed public actions.

PROCESS RATE

Process rate refers to the amount of materials processed by an Industrialist per unit time. The measure is specified in tons, pounds, barrels, per minute, hour, etc.

PRODUCTION LEVEL

This is probably the key item determined by an Industrialist each cycle. It is the number of units of a product his plant will produce in that cycle. The Industrialist is free to set his production at any level he chooses, as long as the figure he sets does not exceed his maximum production capacity.

PRODUCTION PROCESS

A production process is a definable part of the overall production system of a given firm. Each gamed industrial firm may have up to eight production processes, while each non-gamed industrial firm is assumed to have only one process.

QUASI-PUBLIC LAND

This is land owned by tax-exempt organizations such as churches and fraternal organizations. Such land includes church buildings and schools, cemeteries and such miscellaneous buildings as Elks lodges.

REFERENDUM

A referendum is a vote of the (simulated) population of a jurisdiction on some issue presented to the people by the Politician. Most usually referenda are called to approve (or reject) a general obligation bond issue or a request for special millage, although they may be called to approve some legislative matter, such as open housing.

REZONING APPLICATION FEE

The rezoning application fee is a charge of $100, which is assessed for each rezoning request submitted by a Developer or Industrialist. It is included in that player's financial statement for the next cycle.

RINGELMANN NUMBER

The Ringelmann Number is a code for measuring the blackness of smoke plumes and is equivalent to the opacity. Ringelmann Numbers and opacities are used for specifying allowable smoke emissions (Ringelmann for black and opacity for other colors). #0 = zero opacity, #1 = 20%, #2 = 40%, #3 = 60%, #4 = 80%, #5 = 100%. In APEX, all smoke readings are reported as Ringelmann Numbers.

STATE EQUALIZED VALUE

State equalization is a process designed to even out differences in assessment practices among political jurisdictions. The state equalization factor applied to each jurisdiction's assessed value will thus be different. The state equalized value for a jurisdiction, reached by applying the factor to local assessed value, is the base on which millage is levied to generate property tax revenues.

STINKELMANN NUMBER

The Stinkelmann Number is a code (developed in APEX) for measuring odor emissions, and for specifying maximum allowable odor emissions. Numbers range from 0-5, covering least to worst odor levels, respectively.

TAX RATE

See MILLAGE.

UNIT COSTS

The costs to the Industrialist of operating his plant are calculated, for each production component, except labor, on the basis of the amount and cost of each component required to produce one unit of the product. These unit costs apply to fuel, administrative overhead, inventory, and raw materials.

Fuel Cost applies to the fuel required to produce each Industrialist's product and will be different for each fuel type.

General Administrative Costs include all overhead expenditures, other than salaries, involved in production.

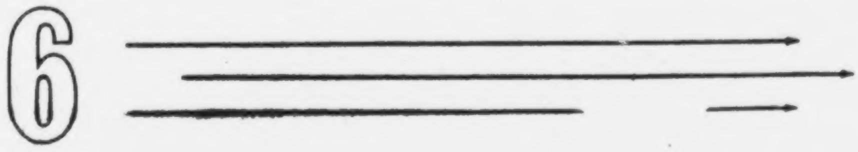
Inventory Carrying Costs must be paid to store product inventory from one cycle to the next. This cost excludes property taxes on inventory.

Materials Costs include all raw materials required to produce the product, except fuel.

The unit costs for each of these components which are applicable for a particular Industrialist for the next year are included in that player's output.

UNIT SALES PRICE

This is the price, which an Industrialist sets each cycle, at which he will sell a unit of his product. Each Industrialist has complete control over price, although the number of units he actually sells will be dependent on the relationship of his price to supply-demand conditions in the general market, and to the current average industry-wide price (reported for the last three years in the Industrialist's output).



ZONING CATEGORY

Zoning categories apply only to vacant land for APEX. Each of the six zoning categories may be developed into one or more types of land use:

ZONING CATEGORY

Zoning categories apply only to vacant land for APEX. Each of the six zoning categories may be developed into one or more types of land use:

FROM	TO
Zoning Category	Developed Land Use Type(s)
(1) R - Single-family residential	(1) R-1 (low density, high cost)
	(2) R-2 (medium density, medium cost)
	(3) R-3 (high density, low cost)
(2) M - Multiple-family residential	(4) M-1 (low density, low cost)
	(5) M-2 (medium density, low cost)
(3) C - Commercial	(6) CL (Commercial-Local)
	(7) CR (Commercial-Regional)
(4) I - Industrial	(8) I (endogenous industry)
	(9) I (exogenous industry)
(5) O - Bureaucratic	(10) O (exogenous bureaucratic)
(6) A - Agricultural	(11) A (active farming)

SECTION 3. PLANNER ROLE DESCRIPTION

Today, in our complex and expanding urban environment, the Planner must be more than a designer of the physical elements of the city; more than a zoning administrator. The planner must be a participant in an urban system and concern himself with the total environmental needs of urban residents.

The Planner must consider the air, the water, the utilization of the land, the beauty of the city, the quality of education, the safety of the streets, the generation of revenue through an adequate tax base, the relative placement of residential, industrial, commercial and recreational areas, and the provision of adequate modes of access among them. In short, he must be concerned with the quality of life and the human environment.

Most important, the Planner must know the process of public policy decision making in his community. This knowledge gives the Planner the ability to plan for continuous, on-going community development, rather than end-state planning, which is doomed to fail.

The decision-making process in APEX, as in the real world, is as varied as the individuals who assume the key roles. Various complex and powerful constraints may frustrate the player, challenging beliefs and values, as well as influence the decisions made. Such forces may ultimately require the selection of trade-offs and alternatives which may be difficult to accept.

The Developers may pressure for modification of the plan; the Politicians may demand support for programs to meet their needs and the needs of their constituents; the Industrialists and Air Pollution Control Officers will frequently be in conflict, and your recommendations may affect their decisions. Thus, while not an elected civil official, the Planner actually operates in a highly political atmosphere.

The Planner must assimilate various complex information inputs, both from the computer and from the game players as indicators of patterns of growth, concentration, movement, and individual and multi-organizational needs of the urban system. These new and foreign information components test his ability to learn, to interpret and to make decisions, often in a period of time which does not permit detailed and analytical analysis. The role is structured only in the sense of the information presented; the expansion of the role is thus limited only by the limits of the player's creativity, involvement, and commitment.

In APEX, Central City Planners have jurisdiction only within the city limits. County Planners, on the other hand, have responsibility for all County-wide facilities, such as the airport and hospitals, as well as for projects in all parts of the County outside the Central City. Co-ordination between the two planning offices will be up to the individual players. It is also possible to create a regional planning office which has general jurisdiction in all of APEX.

The planning function normally consists of both line and staff activities. Line (operating or substantive) functions consist of guiding urban development activities and providing insight into the physical, economic and social characteristics of the community through research activities. Staff (administrative or policy-making) activities relate to the coordination of public programs and advising the Politicians on community goals.

Another way of characterizing the responsibilities of the Planning Department cuts across the line/staff function concept, dividing planning activities into two main categories: Advance Planning and Current Planning.

Advance Planning includes:

1. Preparation of statements on planning policy
2. Preparation of a master plan
3. Research necessary to prepare, support, and update plans and policies

Current Planning includes:

1. Implementation of the master (comprehensive plan) by reviewing or initiating proposals which affect it (*e.g.*, plans for schools, streets, parks, playgrounds)
2. Preparation of the Capital Improvement and Special Programs Budget
3. Process, review and preparation of recommendations on rezoning proposals
4. (In conjunction with Advance Planning) Research and recommendations on policy for current issues and problems facing the community

One Planner may take the primary responsibility for Current Planning while another may act primarily as the Advance Planner. The Advance Planner will be occupied during the initial cycles in familiarizing himself with the data base of APEX such as: community quality indicators, capital plant indices, changes in household and employment, zoning and land use distribution, appraised valuation and sales prices of developed property. These are all prepared anew each cycle by the computer. Using this data he can prepare a master policy plan for the development of the metropolitan area. (*i.e.*, where new development should be encouraged and were discouraged, what should be the nature of the new development, etc.) This policy plan may then be presented to the County Board of Supervisors for adoption. The master plan should be consulted when specific proposals come up (*e.g*. rezoning requests, location of Exofirms, etc.) to be sure that they are compatible with the Plan. It should also provide the rationale for Capital Improvement Program proposals.

The Planner engaged in current play activities will be primarily involved in the preparation of the Capital Improvement Programs list which consists of an itemization of capital projects selected from the Project List. The Capital Improvement Program is prepared by the Planner for one cycle (year) in advance of the current cycle. Thus, in Cycle 2 he is preparing capital budget recommendations which will be presented to the Politicians in Cycle 3. The recommendations appear on the Politicians' printout.

The Planner should be prepared to provide supporting arguments for his proposals when the Politician is drawing up his capital budget. If the Planner's interpretations of future needs were accurate, his recommendations should still be supportable. If, in light of changes which occurred during the preceding year, the Planner wishes to make changes in the projects themselves, or in the priority which he assigns to them, he may do so before presenting his program to the Politician. Of course, at the same time the Planner is presenting one capital program to the Politician, he must also be formulating another to present in the following year. Since it is up to the Politician to budget projects, all the Planner's recommendations are not necessarily followed. If the Politician refuses to budget a project which the Planner feels is essential, the Planner may recommend it again for consideration in the following year.

The Planner may also wish to recommend that the Politician initiate, in the operating budget, certain special programs. These deal primarily with public welfare, and fall outside the realm of normal agency activities. The Planner is free to recommend any programs (which are listed in the Special Program List) which he feels might aid particular worthy groups in the community.

The Planner working with current activities must also make recommendations on all rezoning applications initiated by other players. He may initiate rezoning himself in order to implement the master plan, although the Politicians make the final decision on all rezoning matters. The Planner should have a rationale upon which to base his recommendations on zoning cases, such as the aim of spurring or retarding growth in particular areas.

Another function of the Planner is to advise and consult with the Politicians on current needs in the city, and to provide information when so requested by other players. In addition to his other duties, the Planner must vote in the Elite Opinion Poll for his jurisdiction, both on issues which arise in the newspaper, and on requests of the Politicians for bond issues or special millages, the latter two being informal polls.

The City and County Planners have no direct responsibilities for air pollution control in the game. However, the location of emission sources may become a very real consideration to the APCO and County Politicians in their regulation of such sources. Since the Planners are concerned with relative locations of industrial, commercial, and residential areas, they may find that pollutant emissions and air quality levels are significant factors to be considered in zoning decisions.

Planners may become even more directly involved in making recommendations about the possible location of new Exofirms which may wish to build and operate in their jurisdictions. Specific air pollution emissions characteristics for these firms might be key elements in developing longer-range plans which may improve air quality by controlling the locations of emissions sources. They may also find that those locational considerations which affect travel, and hence, traffic densities, will also affect concentrations of emissions from motor vehicles; hence, air pollution factors will enter into traffic and transit planning.

At the same time, Planners will be concerned with levels of industrial employment and tax base in the City and County, and these may be adversely affected by overly-stringent air pollution regulations or zoning regulations. Planners may be concerned with the interdependencies and trade-offs between various methods for disposing of wastes, recognizing that reduction of air pollution emissions may mean increased solid and liquid waste disposal. And Planners, with their general concern for the quality of life for residents of their areas, should be concerned with the potential effects of air quality on human health, on vegetation and wildlife, on buildings and materials, and on property values.

Obviously, it is important for the Planner to use available information to develop his recommendations in a way which will direct attention toward the more critical problems of a changing and developing community before these become so severe that they cannot be dealt with in a reasonable way. As the Planner's data accumulates through cycles of play, a time series of information becomes available from which trends may be identified.

Three items of specialized information which are included in the Planner's output are particularly relevant to the formulation of a capital improvements program. These are:

* a table of Community Quality Indicators, including such items as the overall capital plant index, population totals, unemployment rate of residents, the number of families with incomes under $3000, the percentage of deteriorated buildings, and the percentage of the population which is non-white, all given by analysis area;

* a table of capital plant indices by budget type (i.e., water, sewers, parks, streets, and miscellaneous) by analysis area, including the relative rank of each analysis area;

* a table showing, by analysis area, the changes in population of each household type.

The Planner should also keep track of information contained in some generally-available tables such as:

* the table of present land use by zoning category by analysis area;

* the table of values (essentially assessed values) of property by zoning category by analysis area.

The Planner role in APEX is analogous to that of the "real world" community planner who has few highly potent control mechanisms to use in preparing and implementing his planning programs and goals. A major part of his success is based on his ability to develop and pursue strategies for community development through an effective interpretation of present needs, trends, and future requirements. Equally important is his ability to convince others, particularly the Politicians and Developers, that the policy recommendations he makes on the basis of these interpretations are sound and reasonable.

In summary, the major activities and responsibilities of the Planner are the following:

-- Formulate goals and policies of his jurisdiction
-- Recommend capital improvement projects
-- Recommend special programs
-- Process, review, and initiate recommendations on rezoning proposals
-- Advise Politicians on issues
-- Provide information to other players
-- Vote in Elite Opinion Poll

SECTION 4. ANNOTATED PLANNER WORKSHEET

The Planner Worksheet has five parts: (1) The Elite Opinion Poll, (2) Recommendations for Capital Improvement Projects, (3) Recommendations for Special Programs, (4) Rezoning Applications and (5) A News Release.

At the end of each cycle, these decisions will be transferred to the computer. Space will be provided on the worksheet for decisions over one cycle. This worksheet will be the official record of your recommendations and decisions as City or County Planner in APEX.

I. ELITE OPINION POLL

Each year certain issues will appear in the APEX Gazette which require decisions from all role players, acting as the "elite" or power structure of the community. In some cases the decision of the elite is binding on the Politicians and the poll can be considered the same as submitting a referendum to the voters. Here the Gazette will read "DECIDED BY OPINION POLL MAJORITY." In other cases, the decision of the elite is merely advisory, and the Politicians can decide whether or not to heed their mandate. Here, the Gazette will read "POLITICIAN'S ULTIMATE DECISION BUT ELITE OPINION SOLICITED."

The outcome of the vote will be recapitulated in the next cycle's newspaper. For each issue outcome, the newspaper will also print the reactions of five pressure groups--Civil Rights Group, Good Government League, Chamber of Commerce, Unions, and Ultra-Conservatives.

Players should vote on all issues in the Elite Opinion Poll, including those on the Business Page. Each role will have one vote. In the cases where there is more than one person in a role, they will have to come to an agreement.

The Elite Opinion Poll is especially important to the Politicians because their actions relative to the poll may affect their chances for re-election.

Instructions: Check the appropriate box for your role at the top left hand side of the page. On the right hand side indicate the cycle number. Then put the issue number in the left hand column (this should not be confused with a project number), and the number of the alternative chosen in the adjacent column.

II. RECOMMENDATIONS FOR CAPITAL IMPROVEMENT PROJECTS

The recommendations for capital improvements, if adopted by the Politicians, provide the most direct method for implementation of the Planning Program. Public expenditures for streets, water and sewer facilities, parks, public buildings, etc., will have a great deal of influence on the direction, magnitude and quality of future development. The Planner works one year ahead of the Politicians in making capital improvement recommendations. The recommendations submitted by the Planner at the end of one cycle will appear on the Planner's output as well as on the Politician's output at the beginning of the next cycle. These will be considered for inclusion in the Politician's next budget.

A complete list of Capital Improvement Projects can be found in Chapter 7 of this manual. The projects are organized by budget categories including (1) streets, (2) sewers, (3) water, (4) parks and recreations, and (5) miscellaneous. The allowable locations for each project are shown on the project list. Some projects are appropriate to an analysis area, some to a ward of the Central City, and others to an entire jurisdiction. A few projects are restricted to a particular analysis area. In addition to specifying a location for the project, the list indicates the area that will be affected by the project This is the area which will share in the services of the project, and the area in which the Capital Plant Index will be affected. If land is required for the project and it is not purchased this cycle by the Politicians, the computer will attempt aquisition of the required land through condemnation of market land from all available zoning catagories. When no land is available the project will not be started.

For each project, there is also a range of costs. The lower end of the range reflects stop gap measures while the higher end indicates high quality improvements. These figures represent the total dollar costs to the community for the project. (Federal and state subsidies have already been taken into account.) To obtain annual costs, the total must be divided by the number of years the project will run. For example, a project which costs $300,000 and runs for two (2) cycles will be amortized through two (2) installments of $150,000 each. A multi-year project which has been approved by the Politicians need not be resubmitted in subsequent cycles. It will automatically be continued for the number of years indicated on the project list.

Instructions: In the first column indicate the desired location for the project, and in the second column the project number. In the third column indicate a suggested expenditure which falls within the range of costs shown on the project list. Finally, in the fourth column, record the number of cycles the project will run. This must also agree with the figure on the project list.

Example:

```
--------------------------------------------------------------------------------------------------------------------------
PROJ  LOCATED    CPI   ACRES  BUDGET                          TITLE                         CYCLES    TOTAL DOLLAR COST    REV.
NUMB    IN     IMPACT REQ'D  CATEGORY                                                       TO RUN  MINIMUM      MAXIMUM  ROAD

   1  ANY AA     AA      0.0  STREETS   RESURFACING OF NEIGHBORHOOD STREETS                    1   $   5000.  $   10000.   NO
   2  ANY AA     AA      0.0  STREETS   RESURFACING OF SECONDARY STREETS                       1   $  50000.  $   75000.   NO
   3  ANY WARD   WARD    0.0  STREETS   REPAIR, RESURFACE PRIMARY STREETS                      1   $ 100000.  $  150000.   NO
   4  ANY AA     AA      0.0  STREETS   WIDEN SECONDARY STREET                                 1   $  90000.  $  120000.   NO
   5  ANY AA     WARD    0.0  STREETS   WIDEN PRIMARY THOROUGHFARE                             2   $ 300000.  $  400000.   NO
   6  ANY AA     AA      0.0  STREETS   CONSTRUCT NEIGHBORHOOD STREETS                         2   $  35000.  $   50000.   NO
   7  ANY AA     AA      0.0  STREETS   CONSTRUCT SECONDARY STREET                             2   $ 175000.  $  225000.   NO
   8  ANY AA     WARD    0.0  STREETS   CONSTRUCT PRIMARY STREET SEGMENT                       2   $ 500000.  $  750000.   NO
   9  ANY AA     WARD    0.0  STREETS   CONSTRUCT EXPRESSWAY FEEDER STREET                     4   $ 170000.  $  220000.   NO
```

II. RECOMMENDATIONS FOR CAPITAL IMPROVEMENT PROJECTS

Location	Project Number	Total Cost	Cycles to Run
17	1	$9,000	1

III. RECOMMENDATIONS FOR SPECIAL PROGRAMS

The Planner may also recommend to the Politicians new or expanded government programs. These special programs differ from capital improvement projects in that they primarily deal with social services and most of the costs are used to support personnel. However, in some cases facilities must be constructed or expanded to accommodate the special programs. In this case, a capital project will have to be requested also. (If you fail to remember, the computer will reject the program). Once the facilities are constructed they can continue to be used if, and when, the special program is renewed.

A complete list of special programs may be found in chapter 7 of this manual. This is similar to the capital project list except that the cost indicated is an annual cost rather than a total cost. Again, once a special program has been initiated, it must be carried for at least the number of cycles specified on the program list.

Instructions: In the first column indicate the desired location for the special program, in the second column indicate the program number, and in the third column indicate the annual cost. The *fourth column should be checked only if the special program is being renewed, and there is an associated capital project which has already been submitted.*

<u>Example</u>:

```
------------------------------------------------------------------------------------------------------------------
SPECIAL   AVAILABLE  CYCLES                         TITLE                               COST PER   CAPITAL PROJECT
PROGRAM      FOR     TO RUN                                                               YEAR     ALSO REQUIRED

   1       ANY AA       3     SUMMER RECREATION PROGRAM FOR POOR CHILDREN               $ 20000.         88
   2       ANY AA       3     PARKWAY TREE-PLANTING PROGRAM                             $ 15000.
   3       ANY AA      15     SANITARY LAND FILL                                        $ 15000.         95
   6       ANY WARD     3     DAY-CARE CENTER FOR CHILDREN OF WORKING MOTHERS           $ 50000.         89
  10       ANY JUR      3     SUMMER CAMP PROGRAM FOR DISADVANTAGED YOUTH               $120000.
  11       ANY JUR      5     JOB-CORPS CENTER FOR SCHOOL DROP-OUTS                     $ 50000.         89
  12       ANY JUR      3     POLICE CIVILIAN REVIEW BOARD                              $ 12000.
  13       ANY JUR      5     POLICE-COMMUNITY RELATIONS BUREAU                         $ 15000.
```

III. RECOMMENDATIONS FOR SPECIAL PROGRAMS

Location	Program Number	Cost per Year	Project in Existence?
3	*1*	*$20,000*	*no*

IV. REZONING APPLICATION

Implementation of the Land Use Plan may also be accomplished through the zoning ordinance which specifies the use to which any given parcel of land may be put. The zoning ordinance at the outset of the game is quite general: Single Family (R) Land may be developed into any one of three price-density classes of houses (see glossary under "Density"); Multi-Family (M) may be developed into either of two price density classes; Commercial (C) may be developed as either local or regional shopping facilities; Industrial (I) as either local or exogenous (see Glossary); Office (O); or Agricultural (A).

The Planner may choose to draft a more stringent ordinance which would specify permitted uses in more detail. The new ordinance, of course, would have to be approved by the Politicians. The amount of developed land and zoned vacant property for each analysis area existing after each cycle is found in the Planner's output in the table entitled "TOTAL PROPERTY DISTRIBUTION".

The Planner is responsible for processing all requests for rezoning from the other players. The Planner will supply rezoning forms to other players upon request and assist them in filling them out. The Planner will then initial the forms signifying his recommendation for approval or disapproval and submit them to the Politicians. He must then schedule a hearing with the Politicians in the appropriate jurisdiction and notify the players of the time and place. The Politicians make the final decision by majority vote.

Aside from processing rezoning requests from others, the Planner may initiate, on his own, recommendations for rezoning of publicly owned land, market owned land, or land held by other players. If the land he proposes to rezone is owned by gamed developers or Industrialists, he must notify them of his intent prior to submitting the form to the Politicians.

NOTE: All rezoned property automatically becomes vacant.

Instructions: Fill out a separate sheet for each rezoning request. All sections must be filled out before the Politicians will consider the application. In section 4 indicate the number of units involved if the land is developed residential. In all other cases, indicate the number of acres involved. In section 5, check the proposed zoning from among the six categories. Then in section 6 indicate, with your initials, whether you favor or oppose the proposal. If the majority of the appropriate Politicians favor the proposal, indicate this in section 6, along with the cycle number in which the final determination was made.

V. NEWS RELEASE

Players may at any time submit articles or headlines that they would like to appear in the APEX Gazette. If the editorial staff of the Gazette deems the article "newsworthy", there will be no cost. Otherwise the cost will be on the order of $100 per line. All articles are subject to review by the editorial staff.

SECTION 5-1

SAMPLE PLANNER'S WORKSHEET

1. ELITE OPINION POLL

Central City Planner ( ) Cycle Number ________

County Planner ( )

ISSUE NO.	ALTERNATIVE

Central City Planner ( )

County Planner ( )

Cycle Number __________

II. RECOMMENDATIONS FOR CAPITAL IMPROVEMENT PROJECTS

Location*	Project Number*	Total Cost*	Cycle to Run

III. RECOMMENDATIONS FOR SPECIAL PROGRAMS

Location*	Program Number*	Cost per Year	Project in Existence?*

IV. REZONING APPLICATION

A. Owner

Developer #1 ( )	Industrialist #1 ( )	General Market ( )
Developer #2 ( )	Industrialist #2 ( )	Central City ( )
Developer #3 ( )	Industrialist #3 ( )	County ( )
Developer #4 ( )	Industrialist #4 ( )	
Developer #5 ( )	Industrialist #5 ( )	
Developer #6 ( )	Industrialist #6 ( )	
Developer #7 ( )	Industrialist #7 ( )	

B. Analysis Area

C. Present Development

Vacant ( ) Developed ( ) Public Bldgs., Park, Etc. ( )

D. Present Land Use

Developed Residential	*Insert No. Units*
R-1 (low density, high cost)	_____
R-2 (med. density, med cost)	_____
R-3 (high density, low cost)	_____
M-1 (low density, high cost)	_____
M-2 (med. density, low cost)	_____

Developed Non-Residential	*Insert No. Acres*
LS (local shopping)	_____
RS (regional shopping, office)	_____
I (endogenous industry)	_____
O (exogenous industry)	_____
O (exogenous bureaucratic)	_____
A (active farming)	_____

Vacant	*Insert No. Acres*
R (single-family)	_____
M (multiple-family)	_____
C (commercial)	_____
I (industrial)	_____
O (bureaucratic)	_____
A (agricultural)	_____

NOTE: ONLY ONE LINE SHOULD BE FILLED IN UNDER "PRESENT LAND USE"

E. Proposed Zoning

R (single-family residential)	_____	I (industrial)	_____
M (multiple-family residential)	_____	O (bureaucratic)	_____
C (commercial)	_____	A (agricultural)	_____

F.

Planners Recommendation		Politicians Decision		Final Outcome
Yes	No	Yes	No	_____
_____	_____	_____	_____	Cycle Number
_____	_____	_____	_____	_____

IV. REZONING APPLICATION

A. Owner

Developer #1 ( )
Developer #2 ( )
Developer #3 ( )
Developer #4 ( )
Developer #5 ( )
Developer #6 ( )
Developer #7 ( )

Industrialist #1 ( )
Industrialist #2 ( )
Industrialist #3 ( )
Industrialist #4 ( )
Industrialist #5 ( )
Industrialist #6 ( )
Industrialist #7 ( )

General Market ( )
Central City ( )
County ( )

B. Analysis Area

C. Present Development

Vacant ( ) Developed ( ) Public Bldgs., Park, Etc. ( )

D. Present Land Use

Developed Residential — *Insert No. Units*

R-1 (low density, high cost) ____
R-2 (med. density, med cost) ____
R-3 (high density, low cost) ____
M-1 (low density, high cost) ____
M-2 (med. density, low cost) ____

Developed Non-Residential — *Insert No. Acres*

LS (local shopping) ____
RS (regional shopping, office) ____
I (endogenous industry) ____
O (exogenous industry) ____
O (exogenous bureaucratic) ____
A (active farming) ____

Vacant — *Insert No. Acres*

R (single-family) ____
M (multiple-family) ____
C (commercial) ____
I (industrial) ____
O (bureaucratic) ____
A (agricultural) ____

NOTE: ONLY ONE LINE SHOULD BE FILLED IN UNDER "PRESENT LAND USE"

E. Proposed Zoning

R (single-family residential) ____
M (multiple-family residential) ____
C (commercial) ____
I (industrial) ____
O (bureaucratic) ____
A (agricultural) ____

F.

Planners Recommendation		Politicians Decision		Final Outcome
Yes	No	Yes	No	
				Cycle Number

IV. REZONING APPLICATION

A. Owner

Developer #1 ( )
Developer #2 ( )
Developer #3 ( )
Developer #4 ( )
Developer #5 ( )
Developer #6 ( )
Developer #7 ( )

Industrialist #1 ( )
Industrialist #2 ( )
Industrialist #3 ( )
Industrialist #4 ( )
Industrialist #5 ( )
Industrialist #6 ( )
Industrialist #7 ( )

General Market ( )
Central City ( )
County ( )

B. Analysis Area

C. Present Development

Vacant ( ) Developed ( ) Public Bldgs., Park, Etc. ( )

D. Present Land Use

Developed Residential — *Insert No. Units*

R-1 (low density, high cost) _____
R-2 (med. density, med cost) _____
R-3 (high density, low cost) _____
M-1 (low density, high cost) _____
M-2 (med. density, low cost) _____

Developed Non-Residential — *Insert No. Acres*

LS (local shopping) _____
RS (regional shopping, office) _____
I (endogenous industry) _____
O (exogenous industry) _____
O (exogenous bureaucratic) _____
A (active farming) _____

Vacant — *Insert No. Acres*

R (single-family) _____
M (multiple-family) _____
C (commercial) _____
I (industrial) _____
O (bureaucratic) _____
A (agricultural) _____

NOTE: ONLY ONE LINE SHOULD BE FILLED IN UNDER "PRESENT LAND USE"

E. Proposed Zoning

R (single-family residential) _____
M (multiple-family residential) _____
C (commercial) _____
I (industrial) _____
O (bureaucratic) _____
A (agricultural) _____

F.

Planners Recommendation		Politicians Decision		Final Outcome
Yes	No	Yes	No	
				Cycle Number

5-4-D

IV. REZONING APPLICATION

A. Owner

Developer #1 ( )
Developer #2 ( )
Developer #3 ( )
Developer #4 ( )
Developer #5 ( )
Developer #6 ( )
Developer #7 ( )

Industrialist #1 ( )
Industrialist #2 ( )
Industrialist #3 ( )
Industrialist #4 ( )
Industrialist #5 ( )
Industrialist #6 ( )
Industrialist #7 ( )

General Market ( )
Central City ( )
County ( )

B. Analysis Area

C. Present Development

Vacant ( ) Developed ( ) Public Bldgs., Park, Etc. ( )

D. Present Land Use

Developed Residential	*Insert No. Units*
R-1 (low density, high cost)	_____
R-2 (med. density, med cost)	_____
R-3 (high density, low cost)	_____
M-1 (low density, high cost)	_____
M-2 (med. density, low cost)	_____

Developed Non-Residential	*Insert No. Acres*
LS (local shopping)	_____
RS (regional shopping, office)	_____
I (endogenous industry)	_____
O (exogenous industry)	_____
O (exogenous bureaucratic)	_____
A (active farming)	_____

Vacant	*Insert No. Acres*
R (single-family)	_____
M (multiple-family)	_____
C (commercial)	_____
I (industrial)	_____
O (bureaucratic)	_____
A (agricultural)	_____

NOTE: ONLY ONE LINE SHOULD BE FILLED IN UNDER "PRESENT LAND USE"

E. Proposed Zoning

R (single-family residential) _____
M (multiple-family residential) _____
C (commercial) _____
I (industrial) _____
O (bureaucratic) _____
A (agricultural) _____

F.

Planners Recommendation		Politicians Decision		Final Outcome
Yes	No	Yes	No	_____
_____	_____	_____	_____	Cycle Number
_____	_____	_____	_____	_____

Cycle Number

V. NEWS RELEASE

The following should be printed in the APEX Gazette: (please write clearly)

NAME ____________________ ROLE ____________________

SECTION 7. A BRIEF DESCRIPTION OF APEX COUNTY

History

The first settlers of APEX County were farm families emigrating from New England and New York State beginning about 1830; during the middle of the nineteenth century German immigrants continued the settlement pattern of dispersed family farms. Income to pay for necessary imports of products from the East was derived primarily from production of farm crops and, more importantly, timber. Small market towns, often containing milling facilities, developed in the period, roughly, between 1820 and 1860, during which time the County was organized as a unit of government by the State and the basic network of roads was completed.

Major impetus for the development of what was to become the Central City as a regional center came with the location there, in 1847, of the State Capitol. Further potential for the growth of the Central City area came in 1855, when the nation's first land grant university was formed just to the east of the city. Central City was incorporated in 1859; the Suburb in which the university was located was not to be incorporated until 1910. The University's control of a large block of land was to exercise profound influence on the physical pattern of development in the future, since much of the logical development corridor outward from the City was pre-empted by this facility.

Steam railroads were first built into APEX County beginning in the 1860's. Small market-milling communities favored with stops and depots on the rail lines began to assume greater importance, over an expanded hinterland, than the small communities not so favored. The impact of the railroads on these small communities can be seen from the following description of the Central City, which may have been particularly favored:

> By the year 1863, the City. . . was a bustling urbanized center. Early accounts tell us that at that time, the City included eleven churches, five hotels, two flouring mills, three tanneries, two breweries, three saw mills, two sash and blind factories, three iron foundries, two printing offices, several brick yards, and a large number of mechanic shops.*

Despite this bustle, it should be noted that manufacturing was not well-advanced; exports were still dominated by agricultural and timber products; most other industry produced for local consumption only.

---

*Tri-County Regional Planning Commission, "History of the Tri-County Region," Information Report 7, undated. pp. 24-25.

Beginning in perhaps 1880, factories for the production of goods to be exported out of the region were first located in the area, fostered by the completion of railroad ties with the rest of the country. The introduction of factories, mainly built near railroad depots, stimulated the migration of factory-worker families into the region; most of these settled near the factories where they were employed, adding further to the growth of the towns favored by the railroad Just before the turn of the century, the introduction of the automobile industry into the Central City gave, probably, the final impetus needed to make the Central City into the dominant community in the County. Beginning about the same time, electric interurban railways were extended from the Central City to the north, east and west, allowing many workers in the new industries in the City to move further away from their places of employment.

By the 1920's, automobiles had become readily available to many people and their use encouraged by the paving of most of the roads in the County. People who had formerly lived fairly close to the interurban system began to be dispersed throughout larger areas and to settle in lower density neighborhoods. In about 1930, the interurban lines were discontinued. The Depression put a damper on further urban sprawl into the outlying township areas, and, until about 1950, most new development was found in the filling-in of the Central City and Suburb. Although the growth of industrial and bureaucratic functions proceeded in the Central City and the area adjacent to it, the more outlying townships remained, and to some extent still remain, predominantly agricultural. The growing urbanization which has occurred more recently in these fringe areas has been primarily stimulated by the construction of the interstate expressway system, beginning in the 1950's.

Political Jurisdictions

In the APEX game, the County is composed of four autonomous jurisdictions: The Central City, Suburb, Township 1 and Township 2. The County has been further divided into 29 "Analysis Areas", each resembling a census tract. The Central City comprises Analysis Areas 1 through 13; the Suburb, AA's 17 through 19; Township 1, to the west, contains AA's 23 through 28 and Township 2, to the east, contains AA's 14-16, 20-22 and 29. (See map). In addition to analysis areas, the Central City is politically divided into Wards: Ward 1 -- AA's 1-4
Ward 2 -- AA's 5-8
Ward 3 -- AA's 9-13

Each Ward is the electoral district for one of the three City Councilmen represented in the game. The County government (Board of Supervisors) is comprised of one member elected from the Suburb, one member from each of the two Townships and two members elected at large from the Central City.

The City Council and County Board of Supervisors are thus the only two governmental units actively represented in the game. Other local governments, including the school boards, are simulated. In some cases, city and County governments have parallel functions; e.g. they both provide police services, planning and capital improvements. The County, however, has area-wide responsibility for three major services not provided by the City government: public health, welfare and air pollution control. In these three areas, county actions directly affect Central City residents as well as residents in the outlying areas. Both the municipal and County governments derive their primary financial support from the same tax base -- real property; County property taxes are paid by land-owners in addition to property taxes collected by the municipal government and the school board in each political jurisdiction.

Data provided to players in the game are nearly always given by analysis area -- this is the primary reference unit. This is also the smallest unit of scale in referring to locations; that is, a project or house or industry is located in "analysis area X" rather than on a particular street or a particular intersection. Characteristics of each individual analysis area, including the socio-economic composition of the residents and the proportions of land area devoted to particular land uses, may be found in the APEX Reference Album. Updates of some of this information are also provided in the computer output from each cycle of play.

A few analysis areas are almost completely characterized by one or two major features which are often referred to throughout play. These major features are given in the following list, with their analysis areas indicated:

Central Business District (CBD) -- nearly all of analysis area 8

State Capitol -- analysis area 8

Ghetto -- analysis area 4 and analysis area 8

University -- analysis area 19 (all)

"Best" residential areas -- analysis areas 9 (all) and 17 (most)

These features are not only unique in the County, but they also dominate the analysis areas in which they are located; in the game they are likely to be referred to as locations in themselves, with no further locational explanation given.

A list of other important man-made features of the County, and their locations, is given later in this chapter.

Geography and Climate

APEX County is located nearly at the center of an industrialized northern State, some 85 miles northwest of one of the largest metropolitan areas in the United States. The once heavily forested land, extending for roughly 320 square miles, is quite flat, for the most part adequately drained for agriculture.

The Grand River, a major watercourse in the State, enters the County from the South in analysis area 23, meanders north and west, then back to the east and north as it passes through analysis area 8, where it is joined by the Red Cedar River, which comes in from the east. The enlarged Grand River exits from the County in analysis area 26, from which it continues west for some 85 miles before emptying into the Great Lake. Major drainage of the County is through the Grand River system.

Just before it empties into the Grand, the Red Cedar River is joined by Sycamore Creek, which wanders up from the southeast. Much of the area in analysis areas 11 and 13, near this creek, is low and somewhat marshy, not ideal for heavy development. The other major marshy area in the County is in analysis area 14, to the northeast in Township 2. There are also several small lakes in this analysis area and quite a large State Park. The largest lake in the County is located in analysis area 16. This was a primary recreation area in the early part of this century but is less ideal now, due to heavy pollution loads and deteriorating shoreline development. There are small creeks which wander through many analysis areas in the County; the only other river of any significant size, however, is Looking Glass River, which runs east and west through the northern portion of the County, primarily in analysis areas 28 and 29.

The climate of APEX County is temperate, with summer temperatures averaging about 70 degrees and winter temperatures which average about 25 degrees. There is an annual rainfall of roughly 30 inches, with heavy snows to be expected primarily in the months of January and February. Prevailing winds are westerly, swinging to the southwest in summer and northwest in winter.

Major Public Facilities

As might perhaps be expected, the Central City and Suburb are significantly better endowed with public capital improvements than are the Townships. The following list includes the most important public structures in the County, indicates under whose jurisdiction they are operated and where they are located:

Airport (County) -- AA 29, just outside the City limits. The Airport has three runways and a terminal of 27,000 square feet. Two commercial airlines serve the County through this airport; cargo and general aviation are also served.

Boys Training School (State) -- AA 7.

City Hall -- AA 6. This is an aged structure, built 80 years ago and considered a scandal. A more central location has been chosen for the new City Hall under construction in AA 8.

Community Centers (City) -- AA's 2, 4, 7, 8, 10, 13. These are mostly old houses purchased by the city to house neighborhood meetings and the operation of special programs.

Community Centers (Township Halls) -- AA's 14 (2), 24, 27, 29.

Community College (County) -- AA 8. The facility is currently housed in an old library and elementary school.

County Building -- AA 8. This includes all county offices and the meeting rooms for the County Board of Supervisors.

County Court House -- AA 8, adjacent to County offices.

Fire Stations (City) -- AA's 2, 3, 4, 5, 6, 8 (2), 11, 12.

Fire Stations (Townships) -- AA's 20, 23, 25. These are modest stations housing limited equipment. Volunteers provide firefighting manpower.

Hospital (County) -- AA 7. This was built in 1912 and was added onto in 1922, 1942 and 1960. It contains 362 beds, including a 35-bed tuberculosis wing, and caters primarily to the indigent. There are three private hospitals in the County with an additional 650 beds.

Library (City) -- AA 8. This is an aged building downtown. There are branch libraries in AA's 1, 5, 11, 12 (2), 13.

Library (Suburb) -- AA 18.

Sewage Treatment Plant (City) -- AA 2. This plant provides both primary and secondary treatment and has a capacity of 34 million gallons per day. It currently averages 22 million gallons daily.

Sewage Treatment Plant (Suburb)-- AA 19. This plant also provides both primary and secondary treatment, with a capacity of 12 million gallons per day; it currently handles an average of 6.75 million gallons daily.

Sheriff Station (County) -- AA 8. This is attached to the County Building.

Water Treatment Plant (City) -- AA 8 (2). Water for the City is derived from a total of 123 wells averaging 400-425 feet in depth. Pumping capacity is 42 million gallons per day, with the average daily pumping currently being 22 million gallons daily. Treatment includes filtration, purification, fluoridation and lime softening.

Water Treatment Plant (Suburb)-- AA 17, AA 19 (2). The Suburb's water is drawn from 7 wells with an average depth of 385-400 feet. Pumping capacity is 6 million gallons daily, with current average pumping being 2.5 million gallons per day. Treatment includes chlorination, fluoridation and ziolite softening.

Zoo (City) -- AA 7.

In addition to the airport, major transportation into and out of APEX County is provided by rail (primarily freight) and expressway. The attached map outlines the routes of the three rail lines, which generally follow the river valleys and intersect in analysis area 8. It also delineates the expressway system and the main arteries feeding the City. One major expressway comes from the Southeast, sweeps around the southern and western fringes of the City and leaves the County from its northwestern corner. A second expressway comes up from the south, intersects the first and continues northward into the Suburb. It is anticipated that in the future this expressway will be continued northwards, then swing west to finish an expressway loop around the City (dashed line).

Industry and the Economy

Major employment in APEX County is provided by the State Capitol Complex, the University and a huge automobile assembly plant, located in analysis area 4. While State Government is a stable, slow-growing industry, the University, typical of "research and development" operations elsewhere, is growing at a very rapid rate. The automobile plant exhibits characteristics similar to any large manufacturing operation, fluctuating considerably in response to the national business cycle.

In addition to these "big three" employers, there is a host of industries supplying parts to the automobile industry, as well as independent industries exporting goods which have no relationship to autos. (A map and listing of the major industries in the County are found on the following two pages.) These include the five gamed industries:

Shear Power Company (Industrialist 1)
People's Pulp Plant (Industrialist 2)
Rusty's Iron Foundry (Industrialist 3)
Caesar's Rendering Plant (Industrialist 5)
Dusty Rhodes Cement (Industrialist 6)

Members of the population of APEX County constitute a work force of about 101,000 people, nearly half of them employed by the major "exporting" industries previously mentioned. About 9% of total County employment is found in lighter industry and 41% in commercial and service activities for the resident population. The greatest concentration of manufacturing employment is, as expected, to be found in the Central City. The highest proportion of white collar workers is found in the Suburb, not unexpectedly, due to the predominance of the University as an employer there. In the future, it is probable that more and more new industrial growth and employment will occur in outlying areas, particularly among firms requiring significant amounts of land for their plants.

Population

Within the physical and political environment described in the preceding pages resides a population of some 227,000 persons, a tiny fraction of whom are represented in APEX as players. The remainder of the population is simulated by the computer in the game. About 63% of the population resides in the Central City, 10% in the Suburb and the remainder in the two Townships.

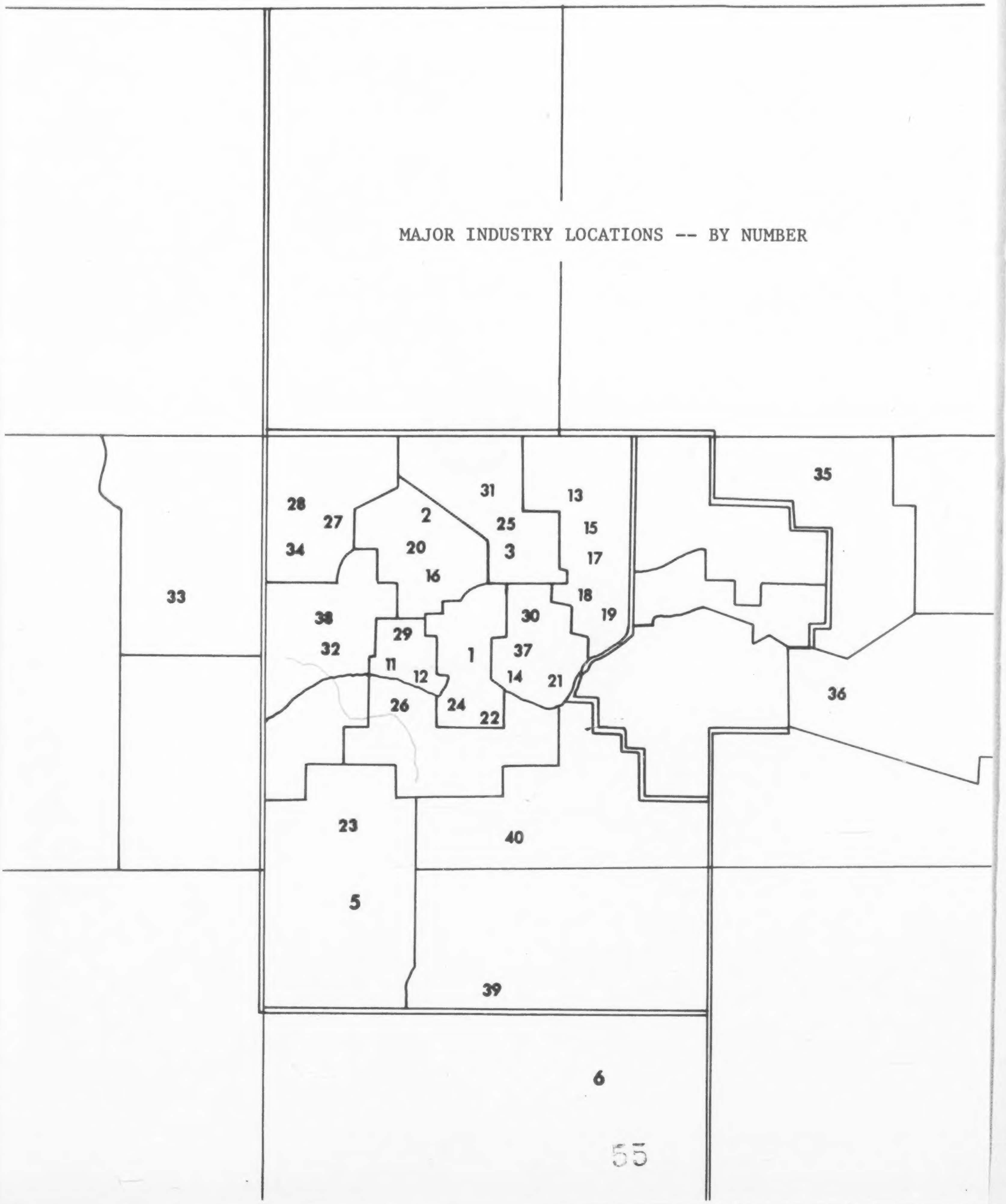
Only about 9.2% of the County's population is black; however, virtually all of this population is found in the Central City, of which 14.4% of the total population is black, primarily in Ward 1, where the number of nonwhite households approaches 38%. The only other significant ethnic minority is found in a Mexican-American community in the east-central portion of the city.

For purposes of the game, the population of APEX County has been divided into five "household types", each representing different occupations and educational achievements, life-styles, voting habits and consumption behavior. These will be described briefly here; more detailed information about each may be found in the Glossary.

Household type 1 is a combination of upper- and upper-middle class families whose household heads are likely to be employed in the professions and business management. Household type 2 is typical middle class, occupations usually found in clerical and lower-level public service areas. Household type 3 includes very low white-collar workers and skilled craftsmen and shop foremen, the latter two predominating. While members of household types 1 and 2 have attended college, some going on for advanced degrees, household type 3 members are typically high school graduates. In outlying areas, farmers are included in this latter type. In household type 4 are found semi-skilled workers and non-domestic service workers. Usually household heads have not completed high school, and while many household type 4's are homeowners, the value of their housing is quite low. Household type 5 includes laborers, domestic workers and the unemployed, with a large number of the elderly. A majority of these households live in rental units of low value.

Initially, about 17.5% of the County population is found in household type 1, 16% in household type 2 and 27% in type 3; about 32% is of household type 4 and 7.5% fall into household type 5. The household composition of a particular analysis area, and of an entire jurisdiction, will affect significantly the demand for both public and private goods and services. It will also affect voting behavior on financial issues and in elections.

A LIST OF MAJOR INDUSTRIES LOCATED IN APEX COUNTY



MAJOR INDUSTRY LOCATIONS -- BY NUMBER

28
27
34
31
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6

List of Major Industries

1. Shear Power Company (A.A. 8)
2. People's Pulp Plant (A.A. 2)
3. Rusty's Iron Foundry (A.A. 5)
5. Caesar's Rendering Plant (A.A. 12)
6. Dusty Rhodes Cement Company (A.A. 23)
11. Auto Assembly Abel (A.A. 4)
12. Auto Assembly Baker (A.A. 4)
13. Auto Assembly Charlie (A.A. 6)
14. Wolverine Forging Plant (A.A. 7)
15. Finch's Forging Plant (A.A. 6)
16. Smithy's Forging Plant (A.A. 2)
17. Ahead Forging Plant (A.A. 6)
18. Wordy Printing Company (A.A. 6)
19. Bogus Printing Company (A.A. 6)
20. Boylan's Fertilizer (A.A. 2)
21. Peter's Water Heaters (A.A. 7)
22. Tar Heel Asphalt Paving (A.A. 8)
23. Concrete Batching (A.A. 12)
24. Spartan Galvanizing Company (A.A. 8)
25. Monkey Brass Melting Company (A.A. 5)
26. Trojan Varnish Manufacturing (A.A. 10)
27. Hannah Feed and Grain (A.A. 1)
28. LaRue Soap and Detergent (A.A. 1)
29. Acme Dry Cleaning (A.A. 4)
30. Trojan Dry Cleaning (A.A. 7)
31. Losten Foundry -- Iron (A.A. 5)
32. Dusty's Cement Products (A.A. 3)
34. Wiffenpoof Fertilizer (A.A. 1)
35. Saint Andre Asphalt Paving (A.A. 15)
36. Oriental Concrete Batching (A.A. 20)
37. Daily Journal Printing (A.A. 7)
38. Tiger Body Assembly (A.A. 3)
39. Academic Feed and Grain (A.A. 13)
40. Spotless Dry Cleaning (A.A. 11)

```
METRO-APEX --  9/ 9/71                                  -- CENTRAL CITY PLANNERS --
 PRINCIPLES OF AIR POLLUTION CONTROL

                                          CHANGE IN HOUSEHOLDS AND EMPLOYMENT DURING

                                  A HOUSEHOLDS                                    //
AA     TYPE 1       TYPE 2       TYPE 3       TYPE 4       TYPE 5       TOTAL    //
   NUM   PCNT   NUM   PCNT   NUM   PCNT   NUM   PCNT   NUM   PCNT   NUM   PCNT //
--------------------------------------------------------------------------------//----

CENTRAL CITY, JUR. 1

 1    14    2.6    -3   -0.5     9    1.9    -4   -1.0     3    6.6    19    1.0 //
 2     3    0.7     4    0.7    11    1.0    14    1.0     2    0.5    34    0.9 //
 3     4    0.8     5    1.0     8    1.0     7    0.8     2    1.2    26    0.9 //
 4    -6   -5.0   -10   -4.8   -27   -5.3   -52   -5.4   -13   -4.9 -108   -5.5 //
 5    -3   -1.2     5    1.4    11    1.1    12    0.8     5    1.5    30    0.9 //
 6     4    0.8     4    1.0     6    1.1     4    0.7     1    0.7    19    0.9 //
 7     6    2.2     1    0.3    11    1.1     5    0.4     4    1.5    27    0.9 //
 8    31   16.2    35   13.6    71   12.4   161   14.1    44   12.1   342   11.9 //
 9    22    7.0    -3   -2.6     9    7.6    -1   -1.1     0    0.0    27    4.1 //
10     5    0.6     9    0.9    10    0.6    18    1.3     1    0.5    43    0.8 //
11     5    1.5     3    0.7     9    1.0     7    0.7     2    1.2    26    0.9 //
12     0    0.0     5    1.3     9    0.9     9    0.7     2    0.8    25    0.8 //
13     0    0.0     3    1.5     2    0.4     5    0.9     0    0.0    10    0.7 //

SUBURBAN CITY, JUR. 2

17     3    0.5     5    1.7     1    0.5     2    1.1    -1   -3.3    10    0.7 //
18  -150  -12.2   -75  -12.5   -45  -12.0   -43  -13.1    -6   -8.6  -319  -14.0 //
19     0    0.0     0    0.0     0    0.0     0    0.0     0    0.0     0    0.0 //

WESTERN TOWNSHIP, JUR. 3

23    54   29.6    84   29.9   175   25.9   211   31.2    34   22.3   558   22.1 //
24    13   29.6    13   21.0    32   16.9    57   18.1    17   19.2   132   15.9 //
25    41   42.3    40   69.0    78   47.6   106   51.8    22   78.6   287   34.3 //
26     4    2.7    -1   -0.8     1    0.5     0    0.0    -1   -1.9     3    0.4 //
27    32   13.2    30   14.3    42   12.4    32   12.2    10   33.4   146   11.9 //
28    42  144.9    24   40.0    94   58.8   159   54.1    43   50.0   362   36.6 //

EASTERN TOWNSHIP, JUR. 4

14     5    4.3    -1   -0.4     6    1.2     4    0.5     1    0.5    15    0.8 //
15     3    0.9     1    0.5     2    0.9     2    0.6     0    0.0     8    0.7 //
16     9    2.5     0    0.0     6    1.4     2    0.5     0    0.0    17    1.1 //
20     0    0.0     6    2.2     1    0.5     3    2.0     0    0.0    10    0.8 //
21    -1   -0.3     3    2.5     1    0.5     3    1.1     1    1.6     7    0.8 //
22     3    6.4    -1   -1.3     0    0.0     2    0.8    -1   -1.2     3    0.5 //
29    -1   -0.7     2    1.4     2    0.6     5    1.1     0    0.0     8    0.7 //
```

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 -- CENTRAL CITY PLANNERS --                                            CYCLE  1,   PAGE   1
                                                                       TEAM    1

OUSEHOLDS AND EMPLOYMENT DURING CYCLE   1

                                  //            B ENDOGENOUS EMPLOYMENT
     TYPE 5         TOTAL       //  LOCAL COMM.  REG.COMM.  LOCAL IND.    TOTAL
T  NUM   PCNT   NUM   PCNT //     NUM   PCNT     NUM   PCNT    NUM   PCNT    NUM  PCNT
--------------------------//----------------------------------------------------------


.0     3    6.6    19     1.0 //     22.     3.7   264.   58.4      0.     0.0   286.   27.0
.0     2    0.5    34     0.9 //   -113.    -2.9   134.   10.2     -2.   -11.1    19.    0.4
.8     2    1.2    26     0.9 //    -17.    -3.1    43.   25.9      0.     0.0    26.    3.8
.4   -13   -4.9  -108    -5.5 //    -29.    -2.7   -15.  -11.1      0.     0.0   -43.   -3.6
.8     5    1.5    30     0.9 //    -27.    -3.3   161.   98.8      0.     0.0   134.   13.7
.7     1    0.7    19     0.9 //    -61.    -3.1   311.   87.4      0.     0.0   250.   10.8
.4     4    1.5    27     0.9 //    -66.    -3.0   238.   40.8      0.     0.0   172.    6.3
.1    44   12.1   342    11.9 //   -234.    -2.8   -11.  -11.1      0.     0.0  -245.   -2.9
.1     0    0.0    27     4.1 //     -1.    -2.8   322.   93.4      0.     0.0   321.   86.8
.3     1    0.5    43     0.8 //    -30.    -3.2   152.   76.0      0.     0.0   121.   10.6
.7     2    1.2    26     0.9 //     12.     1.5   291.   59.1     -2.   -11.1   302.   22.0
.7     2    0.8    25     0.8 //     57.    12.8   288.   90.0      0.     0.0   345.   45.0
.9     0    0.0    10     0.7 //     62.    14.1   312.   67.7     29.    26.9   403.   40.0


.1    -1   -3.3    10     0.7 //    128.    59.1   396.   39.7     -5.    -1.0   519.   30.2
.1    -6   -8.6  -319   -14.0 //     98.    12.6   469.   52.8      3.     0.6   570.   26.1
.0     0    0.0     0     0.0 //     -0.    -2.8   477.   65.2      0.     0.0   477.   64.4


.2    34   22.3   558    22.1 //     92.    42.5   305.   48.9     -2.   -11.1   395.   46.3
.1    17   19.2   132    15.9 //     -1.    -2.8   332.   66.4    -64.    -6.6   267.   17.8
.8    22   78.6   287    34.3 //     95.    40.4   314.   70.5      0.     0.0   409.   60.0
.0    -1   -1.9     3     0.4 //     -1.    -2.8   339.   68.3     -2.   -11.1   337.   63.4
.2    10   33.4   146    11.9 //     99.    44.1   322.   81.0   -370.    -9.9    51.    1.2
.1    43   50.0   362    36.6 //     -1.    -2.8   340.   88.4      0.     0.0   340.   82.2


.5     1    0.5    15     0.8 //     74.    27.0   317.   75.2    -66.    -6.9   324.   19.7
.6     0    0.0     8     0.7 //     88.    35.9   347.   37.8    -11.    -2.1   424.   25.5
.5     0    0.0    17     1.1 //    104.    49.2   348.   48.6      0.     0.0   452.   48.7
.0     0    0.0    10     0.8 //    125.    56.0   398.   49.2     21.     7.6   544.   41.6
.1     1    1.6     7     0.8 //     96.    33.3   367.   27.2     -9.    -1.7   454.   21.2
.8    -1   -1.2     3     0.5 //     -0.    -2.8   345.  100.0      0.     0.0   344.   95.6
.1     0    0.0     8     0.7 //     -1.    -2.8   317.   96.4    -65.    -6.7   251.   18.9
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   TOTAL
   NUM   PCNT
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   286.   27.0
    19.    0.4
    26.    3.8
   -43.   -3.6
   134.   13.7
   250.   10.8
   172.    6.3
  -245.   -2.9
   321.   86.8
   121.   10.6
   302.   22.0
   345.   45.0
   403.   40.0


   519.   30.2
   570.   26.1
   477.   64.4


1  395.   46.3
6  267.   17.8
0  409.   60.0
1  337.   63.4
9   51.    1.2
0  340.   82.2


9  324.   19.7
1  424.   25.5
0  452.   48.7
6  544.   41.6
7  454.   21.2
0  344.   95.6
7  251.   18.9
```

A This table indicates the potential change in location for the five household types, showing which householders would like to change location if there were sufficient housing property available. A positive number indicates a potential increase in an area. (See glossary for description of types.) Compare this table with page 3 to see the actual changes after suitable property was found.

B The exogenous employment in the area would like to have this number of exogenous employees to serve that area. Hence, this table suggests a potential demand for workers, not an actual list of job openings. (See glossary for definition of terms.)

8-1

CENTRAL CITY PLANNERS

CHANGE IN HOUSEHOLDS AND EMPLOYMENT DURING CYCLE 1

```
METRO-APEX --  9/ 9/71                              - CENTRAL CITY PLANNERS --
 PRINCIPLES OF AIR POLLUTICN CONTROL

                          A P O T E N T I A L   D E M A N D   F O R   D E V
                                B E F O R E   A L L O C A T I O N   T O   A V


              /                R E S I D E N T I A L                          /
              /---------------------------------------------------------------/-------
              /            S I N G L E            /   M U L T I P L E         /
              /-----------------------------------/---------------------------/-------
      AA      /       R-1         R-2         R-3 /     M-1         M-2       /

CENTRAL CITY, JUR. 1

       1      /         7           5           0         4           1       /
       2      /         4           8          10         6           8       /
       3      /         4           5           7         5           5       /
       4      /     B  -8         -22         -33       -15         -30       /
       5      /         0           5          10         4          10       /
       6      /         4           5           4         4           4       /
       7      /         4           6           6         4           5       /
       8      /        30          69         103        47          92       /
       9      /        11           9           1         5           0       /
      10      /         6          10          11         8           9       /
      11      /         5           6           7         5           5       /
      12      /         2           6           8         4           6       /
      13      /         1           3           3         2           2       /

SUBURBAN CITY, JUR. 2

      17      /         3           2           2         2           1       /
      18      /       -94         -82         -43       -60         -39       /
      19      /         0           0           0         0           0       /

WESTERN TOWNSHIP, JUR. 3  Township 1

      23      /        61         127         150        93         126       /
      24      /        13          28          39        20          35       /
      25      /        37          64          75        47          65       /
      26      /         2           1           0         1          -1       /
      27      /        26          35          31        26          28       /
      28      /        35          78         105        53          93       /

EASTERN TOWNSHIP, JUR. 4  Township 2

      14      /         4           4           3         3           3       /
      15      /         2           2           1         2           1       /
      16      /         6           5           2         4           2       /
      20      /         1           2           2         1           2       /
      21      /         0           2           2         1           3       /
      22      /         2           1           1         1           0       /
      29      /        -1           2           2         1           1       /
```

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CENTRAL CITY PLANNERS --
                                                        CYCLE  1,  PAGE   3
                                                        TEAM   1

D E M A N D   F O R   D E V E L O P E D   P R O P E R T Y
L O C A T I O N   T O   A V A I L A B L E   U N I T S

A L                  /
---------------------/              N O N - R E S I D E N T I A L
M U L T I P L E      /------------------------------------------------------------------
---------------------/       C O M M E R C I A L        /  INDUSTRIAL
  M-1        M-2     /----------------------------------/------------------
                            LOCAL         REGIONAL      /    LOCAL            AA

    4          1     /      0.80          0.60               0.70             1
    6          8     /     -2.70         -1.60              -1.90             2
    5          5     /      1.40          0.90               1.10             3
  -15        -30     /     -2.50         -1.50              -1.80             4
    4         10     /      2.80          1.60               2.00             5
    4          4     /      2.80          1.60               2.00             6
    4          5     /    -25.60        -13.00             -17.20             7
   47         92     /     -7.60         -4.00              -5.20             8
    5          0     /      6.40          3.40               4.40             9
    8          9     /     -2.20         -1.30              -1.60            10
    5          5     /      4.20          2.30               3.00            11
    4          6     /      1.70          1.10               1.30            12
    2          2     /      7.10          3.80               4.90            13

    2          1     /      3.10          1.80               2.20            17
  -60        -39     /     13.30          6.90               9.00            18
    0          0     /     16.10          8.30              10.90            19

   93        126     /      3.20          1.80               2.30            23
   20         35     /      4.10          2.30               2.90            24
   47         65     /      7.90          4.20               5.40            25
    1         -1     /      3.80          2.10               2.70            26
   26         28     /      9.80          5.10               6.70            27
   53         93     /      1.00          0.70               0.80            28

    3          3     /      3.90          2.20               2.80            14
    2          1     /     10.70          5.60               7.30            15
    4          2     /     10.40          5.40               7.10            16
    1          2     /      8.90          4.70               6.10            20
    1          3     /      3.20          1.80               2.30            21
    1          0     /      7.30          3.90               5.00            22
    1          1     /      7.80          4.10               5.30            29
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.70           1
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.10           3
.80           4
.00           5
.00           6
.20           7
.20           8
.40           9
.60          10
.00          11
.30          12
.90          13


.20          17
.00          18
.90          19



.30          23
.90          24
.40          25
.70          26
.70          27
.80          28



.80          14
.30          15
.10          16
.10          20
.30          21
.00          22
.30          29
```

A The household and employment potential demand shown on page 1 creates a theoretical or potential demand for developed property. This table does not present a final picture, only indications of potential demand for property as a guide for player decisions.

B Figures represent the potential units (residential) and acres (non-residential) needed if positive, and the surplus units or acres if negative.

8-3

CENTRAL CITY PLANNERS

POTENTIAL DEMAND FOR DEVELOPED PROPERTY

BEFORE ALLOCATION TO AVAILABLE UNITS

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METRO-APEX --  9/ 9/71                                   -- CENTRAL CITY PLANNERS --
 PRINCIPLES OF AIR POLLUTION CONTROL


               A HOUSEHOLD   DISTRIBUTION   AFTR  S
                                     AND PERCENT CHANGE FROM LAST CYCLE

               B TYPE 1                  TYPE 2                 TYPE 3                 TYPE
    AA           NUM    PERCENT C    NUM    PERCENT          NUM    PERCENT          NUM

CENTRAL CITY, JUR. 1

     1           551       1.10      506       0.80          491       0.82          371
     2           482       1.47      638       1.11         1213       0.58         1500
     3           532       0.95      560       1.27          872       0.69          895
     4           120       0.84      204      -0.97          500      -0.50          951
     5           240       0.84      366       1.95         1065       0.66         1586
     6           512       1.99      417       1.96          597       1.53          659
     7           280       0.36      456       0.44         1018       0.30         1310
     8           192       0.0       272       5.02          586       1.74         1166
     9           356      13.02      154      33.91          165      38.66          133
    10           922       5.13     1110       3.16         1820       2.30         1443
    11           362       1.69      468       1.08          972       0.73         1005
    12           243       3.85      426       3.90         1117       1.64         1319
    13           134      26.42      248      24.00          590      10.28          634

SUBURBAN CITY, JUR. 2

    17           734       0.82      302       1.34          220       1.85          185
    18          1120      -8.20      528     -11.56          300     -19.57          279
    19           817       0.0       455       0.0           482       0.0           547

WESTERN TOWNSHIP, JUR. 3

    23           259      41.53      346      23.13          748      10.49          753
    24            60      36.36       78      25.81          207       8.95          335
    25           122      25.77       74      27.59          182      10.98          209
    26           173      14.57      165      33.06          276      19.48          281
    27           269      10.70      229       9.05          359       5.28          281
    28            74     155.17      103      71.67          205      28.13          345

EASTERN TOWNSHIP, JUR. 4

    14           122       3.39      205       1.49          533       0.57          819
    15           347       0.58      206       0.49          233       0.43          377
    16           373       1.63      325       1.25          450       0.90          425
    20           674       0.30      278       0.0           215       0.47          159
    21           252       0.80      124       0.81          211       0.48          284
    22            47       0.0        76       0.0           185       0.0           257
    29           132       0.0       148       0.0           366       0.27          489
```

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NTRAL CITY PLANNERS --                                    CYCLE  1,  PAGE   5
                                                          TEAM   1


BUTION  AFTR  SALES  RE-ALLOCATION
CHANGE FROM LAST CYCLE

   TYPE 3                 TYPE 4                 TYPE 5                 TOTAL
 NUM    PERCENT         NUM    PERCENT         NUM    PERCENT         NUM    PERCENT



 491         0.82       371         0.54        46         0.0       1965         0.82
1213         0.58      1500         0.47       413         1.47      4246         0.81
 872         0.69       895         0.79       182         4.60      3041         1.10
 500        -0.50       951        -0.31       256        -3.03      2031        -0.73
1065         0.66      1586         0.51       355         2.60      3612         0.92
 597         1.53       659         1.07       170         3.03      2355         1.68
1018         0.30      1310         0.15       285         0.71      3349         0.30
 586         1.74      1166         1.66       402        10.44      2618         3.15
 165        38.66       133        52.87        36       500.00       844        31.46
1820         2.30      1443         1.83       261         4.82      5556         2.93
 972         0.73      1005         0.50       180         2.27      2987         0.91
1117         1.64      1319         1.31       275         9.13      3380         2.52
 590        10.28       634         7.46       185        50.41      1791        15.25



 220         1.85       185         1.09        32         6.67      1473         1.24
 300       -19.57       279       -14.42        36       -47.83      2263       -12.46
 482         0.0        547         0.0         56         0.0       2357         0.0



 748        10.49       753        11.06       203        32.68      2309        17.09
 207         8.95       335         6.01       102        14.61       782        11.55
 182        10.98       209         1.95        28         0.0        615        11.41
 276        19.48       281        16.12       109       113.73      1004        25.66
 359         5.28       281         6.44        40        33.33      1178         8.27
 205        28.13       345        17.35       121        40.70       848        34.82



 533         0.57       819         0.24       213         0.47      1892         0.69
 233         0.43       377         0.0        129         0.0       1292         0.31
 450         0.90       425         0.71        98         2.08      1671         1.15
 215         0.47       159         1.27        28        12.00      1354         0.59
 211         0.48       284         0.35        65         1.56       936         0.65
 185         0.0        257         0.0         82         0.0        647         0.0
 366         0.27       489         0.20       120         0.84      1255         0.24
```

A This table
potential.

B Household
(type 1) t
glossary.

C Percentage

```
 1,  PAGE    5
 1


 O N


 TOTAL
UM    PERCENT


65          0.82
46          0.81
41          1.10
31         -0.73
12          0.92
55          1.68
49          0.30
18          3.15
44         31.46
56          2.93
87          0.91
80          2.52
91         15.25
```

A This table shows actual distribution, not potential.

```
73          1.24
63        -12.46
57          0.0
```

B Household types range from most affluent (type 1) to least affluent (type 5). See glossary.

```
09         17.09
82         11.55
15         11.41
04         25.66
78          8.27
48         34.82
```

C Percentage change from the preceding cycle.

```
92          0.69
92          0.31
71          1.15
54          0.59
36          0.65
47          0.0
55          0.24
```

8-5

CENTRAL CITY PLANNERS

HOUSEHOLD DISTRIBUTION AFTER SALES RE-ALLOCATION

AND PERCENT CHANGE FROM LAST CYCLE

```
METRO-APEX --  9/ 9/71                              -- CENTRAL CITY PLANNERS --
 PRINCIPLES OF AIR POLLUTION CONTROL

                                         CAPITAL PROJECTS RECOMMENDED FOR CYCLE  2 IN JURIS

PROJ  LOCATED A CPI   ACRES   BUDGET                       TITLE
NUMB    IN    IMPACT  USED   CATEGORY
----------------------------------------------------------------------------------------

  1   AA   4    AA            STREETS     RESURFACING OF NEIGHBORHOOD STREETS
  1   AA   4    AA            STREETS     RESURFACING OF NEIGHBORHOOD STREETS
  1   AA   4    AA            STREETS     RESURFACING OF NEIGHBORHOOD STREETS
  2   AA   3    AA            STREETS     RESURFACING OF SECONDARY STREETS
  2   AA   4    AA            STREETS     RESURFACING OF SECONDARY STREETS
  3   WARD1     WARD          STREETS     REPAIR, RESURFACE PRIMARY STREETS
  4   AA   8    AA            STREETS     WIDEN SECONDARY STREET
 12   WARD1     WARD          STREETS     NEW WARD-WIDE STREET LIGHTING SYSTEM
 20   AA   8    AA       3.5  STREETS     CONSTRUCT LARGE PARKING STRUCTURE
 36   AA   8    AA            SEWERS      EXPAND SANITARY SEWER CAPACITY
 38   WARD2     WARD          SEWERS      EXPAND SANITARY INTERCEPTOR SYSTEM
 51   AA   8    AA            WATER       EXPAND AREA WATER MAINS
 61   AA   8    AA       0.5  PARK,REC    DEVELOP AND EQUIP VEST-POCKET PARK
 65   AA   3    WARD     1.5  PARK,REC    CONSTRUCT PUBLIC SWIMMING POOL
 66   AA  13    WARD     5.0  PARK,REC    DEVELOP BALL FIELD
 69   AA   4    AA            PARK,REC    REPLACE PLAYGROUND EQUIPMENT
 71   AA   3    WARD          PARK,REC    REPLACE PICNIC FACILITIES

TOTAL COST OF RECOMMENDATIONS (NOT INCLUDING LAND)


                                         SPECIAL PROGRAMS RECOMMENDED FOR CYCLE  2 IN JURIS

                        E REQUIRED
PROG        LOCATED        CAPITAL
NUM.          IN           PROJECT                     TITLE
----------------------------------------------------------------------------------------

 11         JUR 1             89             JOB-CORPS CENTER FOR SCHOOL DROP-OUTS

TOTAL COST OF RECOMMENDATIONS (NOT INCLUDING LAND)
```

A Capital Plant Index (see Glossary); this column shows the extent of benefit from each project. (See Capital Project List.)

C See Capita
(of quality

D Indicates

B Planners normally do not record bond numbers in their recommendations.

```
PLANNERS --                                       CYCLE  1,  PAGE  93
                                                  TEAM    1

YCLE  2 IN JURISDICTION 1

                              B FUNDED       CYCLES      C TOTAL
                                BY BOND      TO RUN        COST
--------------------------------------------------------------------

ORHOOD STREETS                               1            $    10000.
ORHOOD STREETS                               1            $    10000.
ORHOOD STREETS                               1            $     6000.
ARY STREETS                                  1            $    75000.
ARY STREETS                                  1            $    75000.
MARY STREETS                                 1            $   125000.
T                                            1            $   120000.
LIGHTING SYSTEM                              1            $   200000.
NG STRUCTURE                                 3      *     $  1000000.
 CAPACITY                                    1            $   300000.
CEPTOR SYSTEM                                2      *     $   400000.
NS                                           3      *D    $   275000.
T-POCKET PARK                                1            $    20000.
MING POOL                                    1            $   200000.
                                             1            $    25000.
UIPMENT                                      1            $     8000.
TIES                                         1            $    25000.

                                                          $ 2874000.

YCLE  2 IN JURISDICTION 1

                                  FUNDED      CYCLES          ANNUAL
E                                 BY MILL     TO RUN            COST
--------------------------------------------------------------------

 SCHOOL DROP-OUTS                              5 *           $  50000.

                                                             $  50000.
```

C See Capital Project List for the price range (of quality) for each project.

D Indicates multi-year project

E Some special f
facilities to h
Program List.)

Important Note:
- only Polit
projects or prog
on this list for a
a project or prog
that cycle, the r
be for a new an

This table is als
as your "official
list of recommen
respond to your
start projects or

```
C TOTAL
   COST
---------

   10000.
   10000.
    6000.
   75000.
   75000.
  125000.
  120000.
  200000.
 1000000.
  300000.
  400000.
  275000.
   20000.
  200000.
   25000.
    8000.
   25000.

 2874000.


   ANNUAL
     COST
---------

$  50000.

   50000.
```

ce) range

E Some special programs require capital facilities to house them. (See Special Program List.)

Important Note: This is a list of recommendations - only Politicians can actually initiate projects or programs. If a recommendation on this list for any cycle happens to duplicate a project or program already in effect during that cycle, the recommendation is assumed to be for a new and duplicate project or program.

This table is also printed out for the Politicians as your "official," as opposed to "informal," list of recommendations. If the Politicians respond to your recommendations, they will start projects or programs from this list.

CENTRAL CITY PLANNERS

CAPITAL PROJECTS RECOMMENDED FOR CYCLE 2 IN JURISDICTION 1

```
METRO-APEX --  9/ 9/71                               -- CENTRAL CITY PLANNERS --
 PRINCIPLES OF AIR POLLUTION CONTROL

            THE FOLLOWING CAPITAL PROJECTS RECOMMENDED FOR CYCLE  1 IN JURI
                                 WERE NOT INITIATED BY THE POLITICIANS

PROJ  LOCATED A CPI    ACRES   BUDGET                     TITLE
NUMB    IN     IMPACT  USED   CATEGORY
-------------------------------------------------------------------------------


                                                   NONE
                                                                        B
            THE FOLLOWING SPECIAL PROGRAMS RECOMMENDED FOR CYCLE  1 IN JURI
                                 WERE NOT INITIATED BY THE POLITICIANS

                            REQUIRED
PROG        LOCATED         CAPITAL
NUM.          IN            PROJECT                       TITLE
-------------------------------------------------------------------------------

  1         AA   8            88          SUMMER RECREATION PROGRAM FOR POOR C
```

A (See Capital Project List for Explanation.)

B Planners may wish to resubmit this program in the next cycle.

Note: This page reports City Council actions, during cycle 1, on the official (printed out) recommendations of the planners. These recommendations (actually made during cycle 0) were printed and delivered to the Politicians in cycle 1; the Politicians picked up the Planners' capital projects but ignored Special Program 1.

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 -- CENTRAL CITY PLANNERS --                                   CYCLE  1,  PAGE  94
                                                               TEAM   1

 RECOMMENDED FOR CYCLE  1 IN JURISDICTION 1
TED BY THE POLITICIANS

           TITLE                                  FUNDED      CYCLES          TOTAL
                                                  BY BOND     TO RUN          COST
-----------------------------------------------------------------------------------


       NONE

 RECOMMENDED FOR CYCLE  1 IN JURISDICTION 1
TED BY THE POLITICIANS

                                                  FUNDED      CYCLES         ANNUAL
           TITLE                                  BY MILL     TO RUN          COST
-----------------------------------------------------------------------------------

MER RECREATION PROGRAM FOR POOR CHILDREN                        3 *     $  20000.
```

B

lanation.)

this program

uncil actions,
(printed out)
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o the Politicians
ked up the
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You may wish to monitor the list of recommendations currently before City Council (see "Capital Projects Recommended for Cycle 2). Any of these recommendations not followed in cycle 2 will appear on this sheet in cycle 3.

Note also that a project / program recommended for a cycle but already being funded during that same cycle is assumed to be a recommendation for an additional project or program to be initiated during the next cycle; if the recommendation is not followed for the additional project, it will appear on this sheet.

CENTRAL CITY PLANNERS

THE FOLLOWING CAPITAL PROJECTS RECOMMENDED
FOR CYCLE 1 IN JURISDICTION 1
WERE NOT INITIATED BY THE POLITICIANS

```
METRO-APEX --  9/ 9/71                                  -- CENTRAL CITY PLANNERS --
 PRINCIPLES OF AIR POLLUTION CONTROL

                            CURRENT SOCIAL INDICATORS _ RANKING OF EACH ANALYSI

     A---------------------------------------------------------------------------
AA   * CAPITAL PLANT   *  POPULATION SIZE   *      UNEMPLOYMENT       *  FAMILI
     *                 *  PERSONS    NO.    *  NO.      LABOR FORCE   *    UNDE
     *   INDEX B RANK  *          FAMILIES  *  PERSONS  P.C.    RANK  *  PERCEN
                                                          C

CENTRAL CITY, JUR. 1

 1      1365.     16         7242     1965           94      2.8      6          2.3
 2       884.     24        16116     4246          261      3.5     18          9.7
 3       715.     26        11387     3041          170      3.2     13          6.0
 4       234.     29         7817     2031          137      3.8     28         12.6
 5       885.     23        13772     3612          236      3.7     23          9.8
 6      1794.      9         8860     2355          129      3.2     11          7.2
 7      1052.     20        12681     3349          211      3.5     20          8.5
 8       390.     28        10152     2618          178      3.9     29         15.4
 9      3282.      1         3148      844           36      2.6      4          4.3
10      1444.     13        20673     5556          305      3.1     10          4.7
11      1918.      6        11202     2987          176      3.3     15          6.0
12      2634.      2        12785     3380          213      3.5     19          8.1
13      1856.      8         6807     1791          113      3.6     22         10.

TOTAL                      142642.  37775.         2259

           PER-CAPITA ASSESSED VALUE ------------------------------------------------
```

A See Glossary. Ranking is in terms of all 29 analysis areas; smallest rank number indicates highest CPI.

B See "Capit
a more
Analysis

C Percenta

```
     -- CENTRAL CITY PLANNERS --                                          CYCLE  1,   PAGE  95
                                                                           TEAM   1

DICATORS _ RANKING OF EACH ANALYSIS AREA AMONG ALL OTHERS

------------------------------------------------------------------------------------------------
 *       UNEMPLOYMENT        *  FAMILIES' INCOME  *  DETERIORATED    *    NON-WHITE
 *  NO.      LABOR FORCE     *    UNDER $3000.    *    BUILDINGS     *    POPULATION
 *  PERSONS  P.C.   RANK     *  PERCENT  *  RANK  *  PERCENT  RANK   *  PERCENT   RANK
                C



        94     2.8      6        2.3        26          0.5     28          0.0      16
       261     3.5     18        9.7        11          2.1      9         36.0       2
       170     3.2     13        6.0        19          0.6     23         35.4       3
       137     3.8     28       12.6         5          2.5      4         81.4       1
       236     3.7     23        9.8        10          0.8     20         10.6       5
       129     3.2     11        7.2        16          1.9     12         21.0       4
       211     3.5     20        8.5        14          0.7     21          6.3       6
       178     3.9     29       15.4         1          2.5      3          3.3       8
        36     2.6      4        4.3        23          0.9     18          0.0      12
       305     3.1     10        4.7        21          1.7     13          0.0      10
       176     3.3     15        6.0        18          0.7     22          0.0      11
       213     3.5     19        8.1        15          2.2      6          0.0      15
       113     3.6     22       10.3         8          2.5      2          0.0      13

      2259

------------------------------------------------------------------$ ---> 3177.
```

s of all
nk number

B See "Capital Plant Indices by Category" for a more detailed breakout of CPI for each Analysis Area.

C Percentage

CENTRAL CITY PLANNERS

CURRENT SOCIAL INDICATORS & RANKING OF EACH ANALYSIS AREA AMONG ALL OTHERS

```
METRO-APEX --  9/ 9/71                                    -- CENTRAL CITY PLANNERS --
 PRINCIPLES OF AIR POLLUTION CONTROL
                                                            Suburb               Towns
                                      CENTRAL CITY         SIM. JUR. 2          SIM. JUR
1. REVENUE
   ASSESSED VALUE                  $   441299200.      $     61631760.      $    726017
 A TAX MILLS (LOCAL)                           44.67                 64.31               38
   TAX REVENUE (LOCAL)             $    17347440.      $      3569093.      $     21170
   NON-TAX REVENUE                 $     3575392.      $       502950.      $       489
   TOTAL REVENUE                   $    20922832.      $      4072043.      $     21659
   COUNTY TAX MILLS                            4.00                  4.00                4
   COUNTY TAX REVENUE              $     1765196.      $       246527.      $      2904
   COUNTY TAX DIST (PERCEN                    69.59                  9.72               11

2. EXPENDITURES
   POLITICIANS                     $     9312265.      $      1735585.      $      2340
   SCHOOLS                         $    11610569.      $      2336458.      $     19319
   TOTAL                           $    20922832.      $      4072043.      $     21659

   EXPENDITURE PERCENTAGES
   POLITICIANS                                44.51                 42.62               10
   SCHOOLS                                    55.49                 57.38               89
   TOTAL                                     100.00                100.00              100

3. POPULATION - HOUSEHOLDS
   (BY HOUSEHOLD TYPES)                NUMB    PCNT          NUMB    PCNT          NUMB    P
        TYPE  1                       4926.   13.04         2671.   43.84          957.   14
        TYPE  2                       5825.   15.42         1285.   21.09          995.   14
        TYPE  3                      11006.   29.14         1002.   16.45         1977.   29
        TYPE  4                      12972.   34.34         1011.   16.59         2204.   32
        TYPE  5                       3046.    8.06          124.    2.04          603.    8
   TOTAL                             37775.  100.00         6093.  100.00         6736.  100
   (PERCENT OF COUNTY POP.            63.33                 10.21                 11.29

   POPULATION - PERSONS
   (BY HOUSEHOLD TYPES)
        TYPE  1                      18463.   12.94        10011.   44.37         3587.   14
        TYPE  2                      20253.   14.20         4468.   19.80         3460.   13
        TYPE  3                      40106.   28.12         3651.   16.18         7204.   28
        TYPE  4                      49216.   34.50         3836.   17.00         8362.   32
        TYPE  5                      14606.   10.24          595.    2.64         2891.   11
   TOTAL                            142644.  100.00        22561.  100.00        25504.  100
   (PERCENT OF COUNTY POP.            63.42                 10.03                 11.34

4. EMPLOYMENT (BY TYPE)
      LOCAL COMMERCE                 21835.   31.34         1009.    8.43          768.    9
      REGIONAL COMMERCE               5081.    7.29         2620.   21.88         2850.   33
      LOCAL INDUSTRY                   137.    0.20         1022.    8.54         4714.   55
      EXOG. INDUSTRY                 33200.   47.65            0.    0.0           146.    1
      EXOG. OFFICE                    9426.   13.53         7322.   61.15           23.    0
   TOTAL                             69679.  100.00        11973.  100.00         8501.  100
   (PERCENT OF COUNTY EMP.            69.86                 12.00                  8.52
ENTRAL CITY PLANNERS --                                       CYCLE  1,  PAGE 107
  Suburb               Township 1          Township 2,        TEAM   1
 SIM. JUR. 2          SIM. JUR. 3         SIM. JUR. 4       B COUNTY

$    61631760.      $    72601200.      $    58637936.      $  634169856.
          64.31                38.16                38.16              4.00
$     3569093.      $     2117048.      $     1709880.      $     2536679.
$      502950.      $       48900.      $       48900.      $     1899669.
$     4072043.      $     2165948.      $     1758780.      $     4436348.
           4.00                 4.00                 4.00
$      246527.      $      290405.      $      234552.      $     2536679.
           9.72                11.45                 9.25            100.00


$     1735585.      $      234033.      $      198427.      $     3984898.
$     2336458.      $     1931916.      $     1560354.
$     4072043.      $     2165948.      $     1758780.      $     3984898.


          42.62                10.81                11.28            100.00
          57.38                89.19                88.72
         100.00               100.00               100.00            100.00


   NUMB    PCNT        NUMB    PCNT        NUMB    PCNT        NUMB    PCNT
  2671.   43.84        957.   14.21       1947.   21.52      10501.   17.60
  1285.   21.09        995.   14.77       1362.   15.05       9467.   15.87
  1002.   16.45       1977.   29.35       2193.   24.24      16178.   27.12
  1011.   16.59       2204.   32.72       2810.   31.06      18997.   31.85
   124.    2.04        603.    8.95        735.    8.12       4508.    7.56
  6093.  100.00       6736.  100.00       9047.  100.00      59651.  100.00
  10.21               11.29               15.17


 10011.   44.37       3587.   14.06       7297.   21.33      39358.   17.50
  4468.   19.80       3460.   13.57       4736.   13.84      32917.   14.64
  3651.   16.18       7204.   28.25       7991.   23.36      58952.   26.21
  3836.   17.00       8362.   32.79      10661.   31.16      72075.   32.04
   595.    2.64       2891.   11.34       3524.   10.30      21616.    9.61
 22561.  100.00      25504.  100.00      34209.  100.00     224918.  100.00
  10.03               11.34               15.21


  1009.    8.43        768.    9.03       1299.   13.55      24911.   24.98
  2620.   21.88       2850.   33.53       4895.   51.07      15446.   15.49
  1022.    8.54       4714.   55.45       3198.   33.36       9071.    9.09
     0.    0.0         146.    1.72          0.    0.0       33346.   33.43
  7322.   61.15         23.    0.27        193.    2.01      16964.   17.01
 11973.  100.00       8501.  100.00       9585.  100.00      99738.  100.00
  12.00                8.52                9.61
```

A Includ
normal
debt

B All coun

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 1,  PAGE 107
 1

B COUNTY

634169856.
      4.00
  2536679.
  1899669.
  4436348.

  2536679.
    100.00


  3984898.

  3984898.


    100.00

    100.00

UMB     PCNT
501.   17.60
467.   15.87
178.   27.12
997.   31.85
508.    7.56
651.  100.00



358.   17.50
917.   14.64
952.   26.21
075.   32.04
616.    9.61
918.  100.00



911.   24.98
446.   15.49
071.    9.09
346.   33.43
964.   17.01
738.  100.00
```

A Includes school tax mills as well as normal operating, special operating, and debt retirement millages.

B All county including central city

8-13

CENTRAL CITY PLANNERS

CAPITAL CITY PLANT

```
METRO-APEX --  9/ 9/71                               -- CENTRAL CITY PLANNERS --
 PRINCIPLES OF AIR POLLUTION CONTROL
                                                          Suburb
5. CAPITAL PLANT TOTALS              CENTRAL CITY           SIM. JURIS. 2
   (BY CATEGORY)                  DOLLARS      PERCENT     DOLLARS      PERCENT
A LOCAL GOVERNMENTS

     STREETS               $  36518704.     39.75  $    8423350.     45.27
     SEWERS                $  21743872.     23.67  $    6340600.     34.08
     WATER                 $  14740756.     16.04  $    2547900.     13.69
     PARKS,REC.            $   2717400.      2.96  $     148200.      0.80
     MISCELLANEOUS         $  16159984.     17.59  $    1145200.      6.16
     TOTAL                 $  91880704.    100.00  $   18605232.    100.00

   SCHOOLS
     ELEMENTARY            $  10724000.     59.98  $    1674000.     58.72
     HIGH SCHOOL           $   7155000.     40.02  $    1176665.     41.28
     TOTAL                 $  17878992.    100.00  $    2850666.    100.00

   COUNTY MISCELLANEOUS               $  11670000.
```

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                                                              CYCLE  1,  PAGE 108
                                                              TEAM   1

 CENTRAL CITY PLANNERS --
           Suburb                     Township 1                Township 2
         SIM. JURIS. 2              SIM. JURIS. 3             SIM. JURIS. 4
ENT      DOLLARS     PERCENT      DOLLARS     PERCENT      DOLLARS     PERCENT


75   $    8423350.     45.27   $  11969800.     64.70   $  15919750.     68.53
87   $    6340600.     34.08   $   4926000.     26.63   $   6363700.     27.39
04   $    2547900.     13.69   $    940333.      5.08   $    206500.      0.89
66   $     148200.      0.80   $     38600.      0.21   $     29600.      0.13
59   $    1145200.      6.16   $    625510.      3.38   $    710714.      3.06
00   $   18605232.    100.00   $  18499712.    100.00   $  23230240.    100.00


58   $    1674000.     58.72   $   2796000.     64.74   $   3900000.     65.03
02   $    1176666.     41.28   $   1522666.     35.26   $   2097428.     34.97
00   $    2850666.    100.00   $   4318666.    100.00   $   5997428.    100.00

0000.
```

A This table relates to "Capital Plant Index." (See Glossary for explanation of Capital Plant Index.) A more detailed breakout of index levels appears on page 102. A low CPI for an area means insufficient services and facilities for that area and a likely emergence of related social and health problems.

8-15

CENTRAL CITY PLANNERS

CAPITAL CITY PLANT

```
METRO-APEX --  9/ 9/71                           -- CENTRAL CITY PLANNERS --
 PRINCIPLES OF AIR POLLUTICN CCNTROL

                                         TOTAL  PROPERTY  DISTRIBUTION  AFTER CY
                                    (INCLUDES ALL GAME PLAYER HCLDINGS PLUS GENER

               //         R E S I D E N T I A L            //         N O N
               //------------------------------------------//----------------
               //      S I N G L E      / M U L T I P L E //      COMMERCIA
               //-----------------------/------------------//----------------
AA      STATUS //    R-1     R-2     R-3/   M-1      M-2   //     LOCAL  REGI
---------------//------------------------------------------//----------------
           A
 1  DEVELCPED //    429     488     363    372      313   /      C.7C     1
    VACANT   B //         476.60             10.80         /          2.56
          PUBLIC AND QUASI-PUBLIC DEVELCPMENT = 115.00 ACRES
          COUNTY BUILDINGS, PARKS, ETC. =   0.0  ACRES
          STREETS AND RIGHT-CF-WAY  C     = 211.10 ACRES

 2  DEVELOPED //    489     937  D 1133    679      999   /     69.97     8
    VACANT    //          0.37               52.64         /          0.89
          PUBLIC AND QUASI-PUBLIC DEVELCPMENT = 163.00 ACRES
          COUNTY BUILCINGS, PARKS, ETC. =   C.0  ACRES
          STREETS ANC RIGHT-CF-WAY        = 345.10 ACRES

 3  DEVELOPED //    466     712     716    527      624   /      1.30     3
    VACANT    //          85.30               C.01         /          0.49
          PUBLIC AND QUASI-PUBLIC DEVELOPMENT = 272.00 ACRES
          COUNTY BUILDINGS, PARKS, ETC. =   C.0  ACRES
          STREETS ANC RIGHT-CF-WAY        = 224.48 ACRES

 4  DEVELOPED //    151     419     63C    287      560   /     25.53     5
    VACANT    //           1.60               0.03         /          0.0
          PUBLIC ANC QUASI-PUBLIC DEVELOPMENT =  38.50 ACRES
          COUNTY BUILDINGS, PARKS, ETC. =   0.0  ACRES
          STREETS ANC RIGHT-OF-WAY        = 116.00 ACRES

 5  DEVELOPED //    297     781    1067    547      912   /     13.30     2
    VACANT    //         268.53              88.32         /          0.0
          PUBLIC AND QUASI-PUBLIC DEVELOPMENT = 306.50 ACRES
          COUNTY BUILDINGS, PARKS, ETC. =   0.0  ACRES
          STREETS AND RIGHT-OF-WAY        = 296.87 ACRES

 6  DEVELOPED //    400     550     537    398      469   /     74.99    10
    VACANT    //         639.56              77.94         /          7.20
          PUBLIC AND QUASI-PUBLIC DEVELOPMENT = 113.00 ACRES
          CCUNTY BUILCINGS, PARKS, ETC. =   0.0  ACRES
          STREETS AND RIGHT-OF-WAY        = 288.36 ACRES

 7  DEVELCPED //    332     741     930    536      810   /     29.66    34
    VACANT    //          20.00              56.61         /          6.69
          PUBLIC AND QUASI-PUBLIC DEVELCPMENT = 279.00 ACRES
          COUNTY BUILDINGS, PARKS, ETC. =  20.00 ACRES
          STREETS AND RIGHT-CF-WAY        = 231.70 ACRES
 CITY PLANNERS --                                    CYCLE  1,  PAGE 109
                                                     TEAM   1

ISTRIBUTION  AFTER CYCLE  1
R HCLDINGS PLUS GENERAL MARKET)

  //          N O N - R E S I D E N T I A L
--//-------------------------------------------------------------
E //       COMMERCIAL       /    INDUSTRIAL      / CFFICE / AGRICULT
---//----------------------/-------------------/--------/---------
2 //     LOCAL  REGIONAL  /  LOCAL       EXCG. /   EXOG./
---//-------------------------------------------------------------


3   /      C.7C      19.75      34.34      53.07        1.92       0.C
    /           2.56                  91.49             5.13       0.0
= 115.00 ACRES
0  ACRES
10 ACRES

9   /     69.97      88.45       7.61      27.53       51.56       0.0
    /           0.89                 178.98             0.09       0.0
= 163.00 ACRES
C  ACRES
10 ACRES

4   /      1.30      34.80      31.75      80.63        7.35       0.C
    /           0.49                  69.17             2.20       0.0
= 272.00 ACRES
C  ACRES
48 ACRES

0   /     25.53      53.88       0.10      45.60        2.39       0.0
    /           0.0                    0.99             0.0        0.C
=  38.50 ACRES
0  ACRES
00 ACRES

2   /     13.30      26.01      35.44      93.97       19.00       0.0
    /           0.0                   47.47             0.67       0.C
= 306.50 ACRES
0  ACRES
87 ACRES

9   /     74.99     100.74      18.72       0.0         8.00     462.30
    /           7.20                   3.50             3.09       0.0
= 113.00 ACRES
0  ACRES
36 ACRES

0   /     29.66      34.02       1.56      18.96       24.03       0.0
    /           6.69                   7.98             0.27       0.C
= 279.00 ACRES
00 ACRES
70 ACRES
```

A Developed res
vacant reside
is shown in

B Remember th
in an area n
therefore not
purchase.

C Includes side

D Refers to lan

```
LE  1,  PAGE 109
M   1

-----------------
FFICE / AGRICULT
-------/---------
 EXOG./
-----------------

  1.92        0.0
  5.13        0.0


 51.56        0.0
  0.09        0.0


  7.35        0.0
  2.20        0.0


  2.39        0.0
  0.0         0.0


 19.00        0.0
  0.67        0.0


  8.00      462.30
  3.09        0.0


 24.03        0.0
  0.27        0.0
```

A Developed residential land is shown in units; vacant residential and all non-residential is shown in acres.

B Remember that some or all vacant land in an area may be privately owned and therefore not necessarily available for purchase.

C Includes sidewalks, land for utility lines, etc.

D Refers to land for churches, cemeteries, etc.

CENTRAL CITY PLANNERS

TOTAL PROPERTY DISTRIBUTION AFTER CYCLE

(INCLUDES ALL GAME PLAYER HOLDINGS

PLUS GENERAL MARKET)

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METRO-APEX --  9/ 9/71                                  -- CENTRAL CITY PLANNERS --
 PRINCIPLES OF AIR POLLUTION CONTROL

                               A C A P I T A L   P L A N T   I N D I C E S   B
                                                          AFTER CYCLE  1

    /          STREETS         /          SEWERS          /         WATER          /  P
AA  /  AMOUNT    INDEX RANK /  AMOUNT    INDEX RANK /  AMOUNT    INDEX RANK /  A

CENTRAL CITY

 1      2551900.  546.  21      2060200.  441.  12        959156.  205.   9
 2      3207850.  363.  23      1742500.  197.  19       1208000.  137.  13
 3      2115300.  228.  27      1597600.  173.  21       1251800.  135.  14
 4      1212450.   86.  29       690700.   49.  26        573400.   41.  17
 5      2641800.  322.  24      1711200.  209.  18       1227500.  150.  12
 6      3431150.  769.  16      1720800.  386.  13       1220500.  274.   5
 7      1845850.  320.  25      1565700.  271.  15       1022700.  177.  11
 8      2864750.  159.  28      1404800.   78.  24       1116500.   62.  16
 9      1029600.  903.  12      1172700. 1029.   1        716900.  629.   1
10      5106501.  622.  19      2199600.  268.  16       2031700.  248.   7
11      2943050.  720.  17      1941700.  475.  11       1315900.  322.   3
12      4900451. 1160.   5      3050300.  722.   6       1535500.  364.   2
13      2668100. 1011.   9       886100.  336.  14        561200.  213.   8

SUBURBAN CITY, JUR. 2

17      2909000. 1019.   8      2320400.  813.   3        804900.  282.   4
18      2796450.  674.  18      2401900.  579.   8       1054600.  254.   6
19      2717900.  314.  26      1618300.  187.  20        688400.   79.  15

URBANIZING TOWNSHIP, JUR. 3 Township 1

23      2658100.  854.  15      2389200.  767.   5             0.    0.  23
24      2168500. 1091.   6            0.    0.  27             0.    0.  27
25      1476800. 1272.   2       591800.  510.   9             0.    0.  25
26      2169000. 1506.   1       913100.  634.   7             0.    0.  26
27      2377700.  511.  22      1031900.  222.  17        940333.  202.  10
28      1119700.  950.  11            0.    0.  28             0.    0.  28

URBANIZING TOWNSHIP, JUR. 4 Township 2

14      3064700.  951.  10       376700.  117.  23             0.    0.  29
15      2286100.  861.  14      1321500.  498.  10             0.    0.  24
16      2153450.  875.  13      1915900.  779.   4         87700.   36.  18
20      3065300. 1241.   4      2162700.  876.   2         64900.   26.  19
21      1647700.  621.  20       424900.  160.  22         30200.   11.  20
22      1189500. 1271.   3            0.    0.  29             0.    0.  22
29      2513000. 1084.   7       162000.   70.  25         23700.   10.  21
```

```
 CITY PLANNERS --                                   CYCLE  1,  PAGE 116
                                                    TEAM   1

   I N D I C E S    B Y    C A T E G O R Y
FTER CYCLE  1

   WATER            /  PARKS & RECREATION   /  B MISCELLANEOUS      /
OUNT    INDEX RANK  /  AMOUNT     INDEX RANK /  AMOUNT    INDEX RANK /


59156.   205.    9      101000.    22.   11     702608.   150.   11
08000.   137.   13      249000.    28.    9    1405216.   159.    9
51800.   135.   14      251600.    27.   10    1405216.   152.   10
73400.    41.   17      101000.     7.   15     702608.    50.   22
27500.   150.   12      270800.    33.    7    1405216.   171.    8
20500.   274.    5      221600.    50.    4    1405216.   315.    4
22700.   177.   11      229800.    40.    6    1405216.   244.    7
16500.    62.   16      214600.    12.   14    1405216.    78.   19
16900.   629.    1      119800.   105.    1     702608.   616.    1
31700.   248.    7      402600.    49.    5    2107824.   257.    6
15900.   322.    3      240200.    59.    2    1405216.   344.    2
35500.   364.    2      234400.    55.    3    1405216.   333.    3
61200.   213.    8       81000.    31.    8     702608.   266.    5


04900.   282.    4       57400.    20.   12     373400.   131.   13
54600.   254.    6       72100.    17.   13     569100.   137.   12
88400.    79.   15       18700.     2.   22     193700.    22.   29


    0.     0.   23       10600.     3.   19     175000.    56.   21
    0.     0.   27           0.     0.   27     150000.    75.   20
    0.     0.   25           0.     0.   25      91670.    79.   18
    0.     0.   26           0.     0.   26     127384.    88.   16
40333.   202.   10       20000.     4.   18     127384.    27.   28
    0.     0.   28        8000.     7.   16      35714.    30.   27


    0.     0.   29        9000.     3.   21     258000.    80.   17
    0.     0.   24           0.     0.   24     110000.    41.   25
87700.    36.   18        8000.     3.   20     110000.    45.   24
64900.    26.   19       12600.     5.   17      90714.    37.   26
30200.    11.   20           0.     0.   28     123714.    47.   23
    0.     0.   22           0.     0.   23      89714.    96.   14
23700.    10.   21           0.     0.   29     215000.    93.   15
```

A (See Glossary)

B Public build
police cars,

Note: Capital
area increase
projects start
in the area
that the CQI
you should
values depr
5% each cyc
capital plant
in addition to
in an area.

```
1,  PAGE 116
1

LLANEOUS      /
 INDEX RANK  /


 150.   11
 159.    9
 152.   10
  50.   22
 171.    8
 315.    4
 244.    7
  78.   19
 616.    1
 257.    6
 344.    2
 333.    3
 266.    5


 131.   13
 137.   12
  22.   29



  56.   21
  75.   20
  79.   18
  88.   16
  27.   28
  30.   27


  80.   17
  41.   25
  45.   24
  37.   26
  47.   23
  96.   14
  93.   15
```

A (See Glossary)

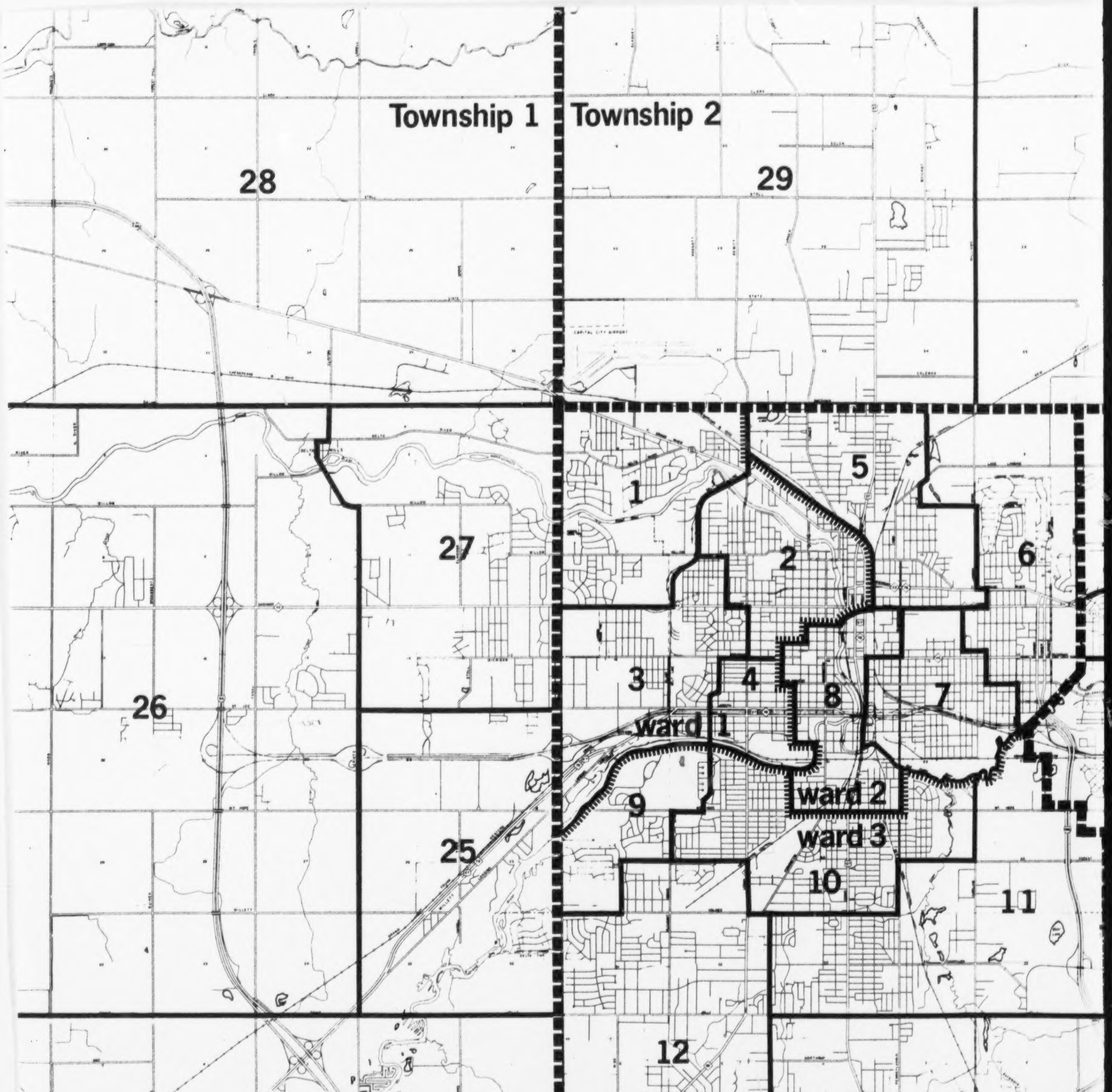
B Public buildings, equipment (fire trucks, police cars, etc.)

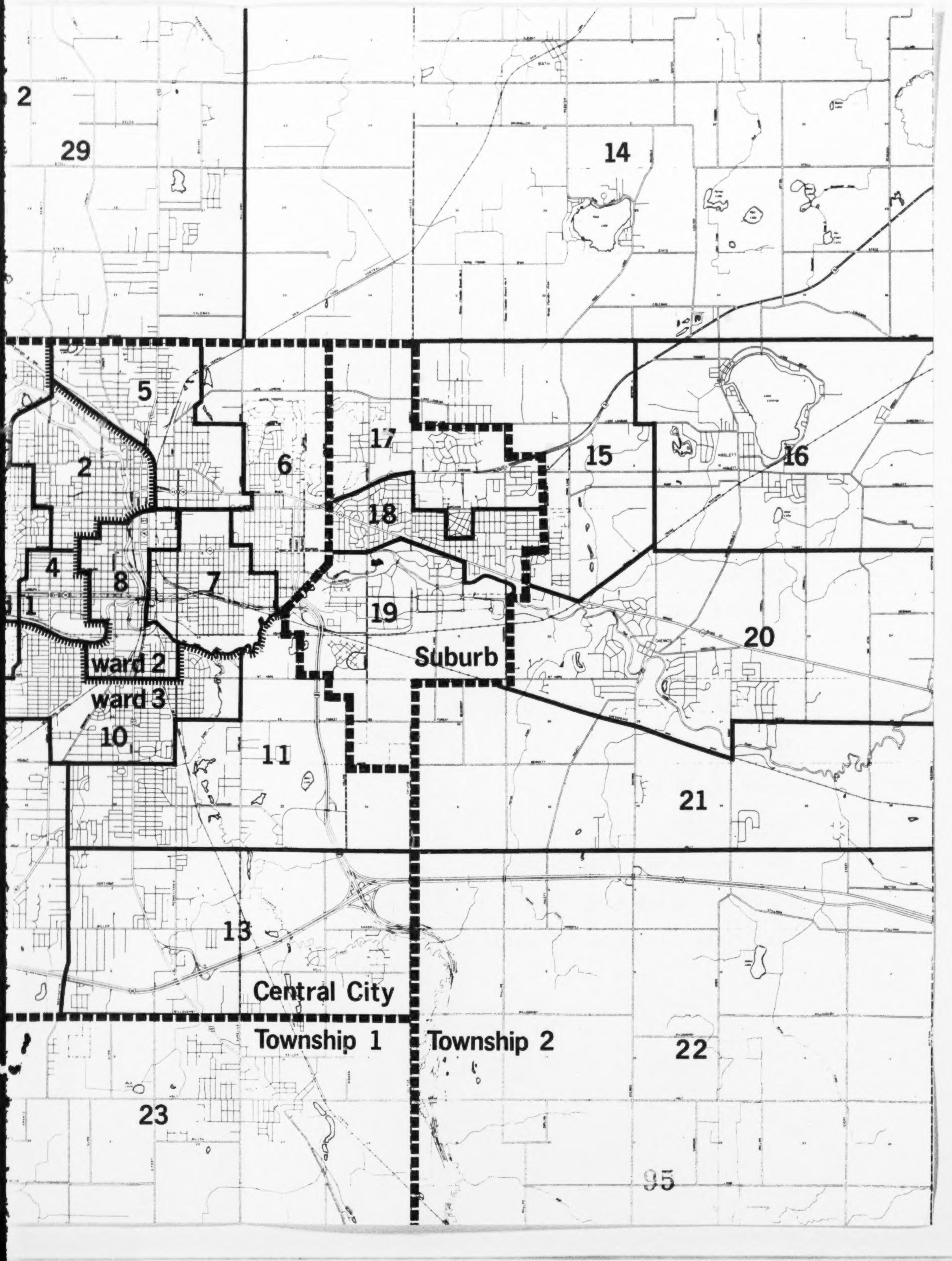
Note: Capital plant values in an analysis area increase by the value of new capital projects started in that area; if the population in the area remains stable, we may assume that the CPI will tend to rise. However, you should remember that capital plant values depreciate at a standard rate of 5% each cycle also, so that a gain in capital plant value must overcome depreciation in addition to improving the expenditure level in an area.

8-19

CENTRAL CITY PLANNERS

CAPITAL PLANT INDICES BY CATEGORY


Township 1
Township 2
28
29
1
5
27
2
6
3
4
8
7
26
ward 1
9
ward 2
ward 3
25
10
11
12
13
Central
Townshi
24
23


2
29
14
5
2
6
17
15
16
18
4
8
7
1
19
20
Suburb
ward 2
ward 3
10
11
21
13
Central City
Township 1
Township 2
22
23

● 29 APEX ANALYSIS AREAS

TOWNSHIP 1

Areas 23, 24, 25, 26, 27 and 28

TOWNSHIP 2

Areas 14, 15, 16, 20, 21, 22 and 29

SUBURB

Areas 17, 18 and 19

CENTRAL CITY

Ward One: Areas 1, 2, 3, and 4

Ward Two: Areas 5, 6, 7 and 8

Ward Three: Areas 9, 10, 11, 12 and 13